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# REPORT

OF THE

## DEPARTMENT OF MINES,

NOVA SCOTIA,

NEW YORK

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FOR THE YEAR 1885.

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COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.

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# DEPARTMENT OF MINES.

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## REPORT FOR THE YEAR 1885.

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*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the  
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the mineral resources of the Province, and the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,

*Commissioner of Public Works and Mines.*

HALIFAX, February 16th, 1886.



REPORT  
ON THE  
MINES OF NOVA SCOTIA,  
BY EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,  
INSPECTOR OF MINES.

(Member of the North of England and the American Institutes of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, February 15th, 1886.

TO THE HONORABLE  
CHARLES E. CHURCH, M. P. P., M. E. C.,  
Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines and Mineral resources of Nova Scotia, and the progress of mining during the year 1885.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1885, compared with that of the previous year:

	1884.	1885.
Gold ..... Ounces.....	16,079	22,203
Iron Ore.....Tons.....	54,885	48,129
Manganese Ore ..... " .....	302	353½
Copper " ..... " .....	110	
Lead " ..... " .....	100	
Barytes " ..... " .....		300
Antimony " ..... " .....	600	*758
Coal raised..... " .....	1,389,295	1,352,205
Gypsum ..... " .....	111,068	87,644
Building stone ..... " .....	780	3,827
Coke made..... " .....	40,085	30,185
Limestone ..... " .....	25,567	16,429
Grindstones, etc..... " .....	2,200	2,208

\* Amount exported.



Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report. /

I also beg leave to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act. They have prepared for the report a table showing the number of tons of water raised from the mines last year compared with the official returns of the number of tons of coal raised. From these tables it would appear that 3,646,889 tons of water have been pumped, in order to permit the raising of 1,352,205 tons of coal. They have also prepared tables giving the dimensions and duty of the pumps used at the various collieries, and these will, it is expected, be presented in the next annual report.

In September, the American Institute of Mining Engineers held their annual meeting in Halifax. Through the courtesy of the Minister of Railways, free passes were granted to the members over the Intercolonial Railway, and money grants to promote the objects of the session were given by the Dominion and by the Provincial Governments.

At the sessions many papers of interest were read, and excursions made on the harbor and to the New Albion Gold Mines at Montagu, etc. The citizens of Halifax materially promoted the success of the meeting by a reception and an excursion on the harbor.

After the conclusion of the meeting the members separated. One large party visited the Pictou coal mines, and by special trains, boats, etc., were afforded facilities for visiting the coal, iron, copper, and other mineral resources of Cape Breton. Another party visited the Londonderry iron mines, and the Spring Hill coal mines; while those whose time did not allow of any lengthened stay, returned by a special train through the Annapolis valley, visiting the Windsor plaster quarries, etc., on the way.

The visitors were much pleased and greatly impressed with the varied mineral resources of the Province; and the opportunities extended to them of becoming acquainted with our coal, gold and other ores will undoubtedly prove of benefit to us in the future. Their opinion of the Province may be gathered from the following quotation from observations on the meeting published by Dr. Raymond, Secretary of the American Institute of Mining Engineers:—"Nova Scotia has been treated with great partiality by nature, which has heaped upon it with great prodigal hand, the choicest treasures of her mysterious laboratory. Gold, the sorcerer that bewitches the world; coal, the mainspring of civilization; iron ore, manganese, gypsum, and many other useful minerals, are placed in large abundance within easy reach of man, in a fertile country with

wholesome climate. In their proximity to each other and to magnificent harbors, nature has provided all the natural elements of national wealth and prosperity. The artificial elements, capital and energy, only have to be added to secure for this favored land an enviable position among the nations of the earth."

The visit of these Engineers, many of whom are connected with the largest mining and mineral investment undertakings of the United States, will undoubtedly benefit us quite as much as their visit to Montreal a few years ago proved advantageous to that section of the Dominion, the result of which was speedily visible in a large investment of United States capital in the iron ore, phosphate, asbestos, and other mines of Quebec and Ontario.

The wisdom of the Provincial and Dominion Governments in facilitating their opportunities for seeing the country, were commented on by the Engineers, who arrived with an idea that the country was an inferior edition of the State of Maine, and left it impressed with the fact that it contained, in a small compass, unusually large stores of those minerals which nature seldom places in propinquity. The discussion of measures affecting our coal trade relations with the Atlantic ports of the United States cannot fail to be advanced by the experience of those who have personally seen the evidences of our ability to furnish cheap and good fuel to the iron and other manufacturing industries of the Eastern States, which are already dreading the gradual removal of these occupations to the cheap coal of the Western States.

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### MINERAL RESOURCES OF NOVA SCOTIA.

In the following remarks I have tried to give briefly, and as clearly as I could, an account of the value and extent of the mineral resources of Nova Scotia. I would refer those desiring more detailed information to the Reports of the Department of Mines, to Sir J. W. Dawson's "Acadian Geology," and to papers by the writer in the Transactions of the North of England Institute of Mining Engineers, the Transactions of the Nova Scotia Institute, etc.

It will be observed that we have in our Province coal, iron and gold, and the development of the two last named minerals will form an important page in our future history. Copper, manganese, antimony, barytes, gypsum, marble, etc., also occur in abundance, and have been worked to some extent.

Future researches will probably disclose other valuable minerals, thus the Precambrian rocks of Cape Breton, like their counter parts in Quebec and Ontario, may yield phosphates, plumbago, asbestos, etc., in addition to the iron and copper ores already known to exist in them.

These resources are being gradually developed, and few of the English colonies offer a more promising field to the miner and capitalist. The natural position of Nova Scotia projecting into the North Atlantic with fine harbors, cheap fuel, numerous minerals, its healthy climate and orderly population, and its nearness to England, all combine to forecast an important and prosperous future for it.

# MINERALS OF NOVA SCOTIA.

## COAL

### THE COAL FIELDS OF NOVA SCOTIA.

Nova Scotia coals belong entirely to the bituminous system of Dana, and may be subdivided into cooking, free burning, and carmel coals. It may be remarked that the coals of this country belong to the same geological horizon of the carboniferous system as those of England and the Eastern United States, and present many points of intimate connection in fossil remains and in the associated strata.

### SYDNEY COAL FIELD.

This district occupies the eastern shore of Cape Breton County. Its land area is estimated at 200 square miles, and it now forms the rim of an extensive coal field extending under the Atlantic. Fortunately experience has proved that nearly all the seams can be followed in their subaqueous extension. Estimates based on the system of enquiry adopted by the Royal Commission on the duration of the coal supply of Great Britain, put the amount of available coal in these submarine areas, after making proper deductions for waste, etc., at not less than 2,000,000,000 tons.

The following section, taken in the Lingan district, will serve to show the thickness and relative positions of the best known seams :—

Seam.	Strata and Coal.	
	ft.	in.
Seam A.....	3	..
" .....	306	..
Carr .....	6	5
" .....	190	..
Barrasois, or Hub .....	12	1
" .....	379	3
Harbor, Victoria or Sydney .....	8	..
" .....	235	..
Seam D.....	3	..
" .....	78	..
North Head.....	4	..
" .....	75	..
McAuley, Phelan, or Lingan .....	8	..
" .....	95	..
Ross, or Emery .....	4	6
" .....	340	..
Gardener .....	4	9

The coal field is remarkably free from disturbances, etc., and Professor Lesley, in a report, dwells strongly on this point.

Nearly all the seams lie at easy angles, yield little water, and owing to the generally firm character of the roof, they can be mined with unusual cheapness and safety. So strongly marked is the

impermeable nature of the strata, that at a moderate depth the submarine workings are perfectly dry.

There are seams found underlying those given in the above section, and varying in thickness from two to eight feet, but in the presence of the seams cropping on the shore they have not hitherto attracted much attention.

The coals of this district are bituminous, and specially adapted for gas and coke making, and for steam purposes. The Sydney Mines coal is largely used in the Lower Provinces for domestic purposes. The gas values may be understood from the following test made of the Harbor seam coal:—

Gas, cubic feet per ton.....	10,000
Candle power .....	16
Coke, good, lbs.....	1,470

Official reports on this seam made to the Admiralty show that it contains 83.5 per centum of carbon, and that it is practically equal to Welsh steam coal. Trials made on H. M. S. *Gannet* show that when mixed with twice its weight of the best Welsh coal, a saving of 12 per cent over the Welsh coal alone was obtained. Practical tests made some years ago for the United States Naval Department, showed a practical evaporative power of 7.9 lbs. for the Sydney seam. Similar tests and trials of the other seams show equally good results, and Sydney Harbor has become a well-known port of call for steamers requiring bunker coal. Newfoundland sealing steamers prefer Cape Breton coal to all other owing to the rapidity with which it raises steam.

These coals have been largely used on Canadian railways, and are found to compare most favourably with the best imported coals, and in many cases are given the preference. As yet the slack coal has not been burned into coke except in small amounts for the local foundries, but considerable quantities are shipped to the United States, where an economical fuel is made by mixing it with the dust of anthracite coal for use under ordinary steam boilers. The contemplated establishment of large iron and copper works on Sydney Harbor will afford a near market for both slack and coke.

The following analyses will serve to show the general character of the seams of the district : \*

Composition.	Name of Seam.		
	Sydney.	Phalen.	Harbor.
Moisture .....	1.260	.921	.80
Vol: Comb: Matt: Fast Coking.....	35.514	30.312	29.40
Fixed Carbon " .....	59.111	62.334	65.50
Vol: Comb: Matt: Slow Coking .....	33.840	28.625	27.85
Fixed Carbon " .....	60.785	64.021	67.05
Ash .....	4.115	6.433	4.30
Sulphur .....	1.705	1.105	1.29
Theo: Evaporative power .....	8.33	8.78	9.19

\* The analyses of coals in this report are by the writer, and for full information on the compositions and values of Nova Scotian coals the reader may refer to a paper on Canadian coals by the writer in the *Transactions of the North of England Institute of Mining Engineers*, 1878.

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The statistical tables of this report will show the production of coal and the various classes of labor employed in the collieries of Cape Breton County. It may be remarked that the collieries are well equipped, and worked in a systematic manner; and that, standing between the English and American coal fields, the operators have adopted from both the appliances and methods a varied experience has shown to be best adapted to the needs of Nova Scotian coal mining.

The enormous amount of available coal contained in this district may be estimated from the Geological Survey Report, which states that the seams now opened contain, in the areas leased for the purpose of working them, over 212,000,000 tons. This estimate does not include the coal in the seams which are unopened in the land areas in operation, nor the values of the seams in the leases which are at present awaiting a favorable opportunity for development, which items would swell the coal supply of this district to figures representing many years output greatly exceeding any yet obtained.

In addition to the seams already recognized in the Sydney coal field as at present worked, there are, in the vicinity of Sydney, and in the Mira and Salmon River districts, extensive tracts of the upper part of the millstone grit in which are met coal seams, some of superior quality, which although too small to be worked now in the presence of the large beds, must yield in the future an important supply of fuel.

#### OTHER CAPE BRETON COAL FIELDS.

On the River Inhabitants and at Port Hood, Chimney Corner, and Broad Cove, on the western shore of the Island, are small coal districts containing in all about 125 square miles, exclusive of the submarine extension of the seams found in them. At several points in these districts beds of coal of large size and of excellent quality have been opened, but as yet systematic coal mining operations in Cape Breton island have been confined to the Sydney district. It is claimed that many of these seams of coal are of very superior steam raising qualities, and it is anticipated that as the coal trade extends, the St. Lawrence markets will be largely supplied from this source.

Passing to Nova Scotia proper, coal seams are found at Pomquet and Antigonish, but the extent of productive ground is inconsiderable. Near New Glasgow, in Pictou County, there is a coal district, not of large extent, but noted for the great size of its coal beds, and for their excellent quality.

In 5,567 feet of strata, according to the surveys of the late Sir William Logan, there are 141 feet of coal contained in 16 beds, varying in thickness from 3 to 34 feet.

The coal is slightly less bituminous than that found in the Sydney district, and is especially adapted for steam raising. Several of the coals make an excellent coke which has been successfully used with raw coal in the blast furnaces of Londonderry in Colchester County. The coal of the Acadia seam is also in demand for domestic purposes.

The following analyses of the Albion main seam, thirty-four feet thick, and of other seams now worked, will show the quality of the coals:—

COMPOSITION.	Albion Main Seam.	Acadia Colliery.	Six Feet Vale Colliery.	Intercolonial. Colliery.
Moisture.....	1.05	2.10	1.22	1.52
Vol: Comb: Matt: Fast Coking ....	27.42	32.78	25.87	31.87
Fixed Carbon " ....	62.18	57.57	62.70	57.78
Vol: Comb: Matt: Slow Coking ....	26.19	29.20	22.96	29.46
Fixed Carbon " ..	63.41	61.15	65.61	60.19
Ash .....	9.35	7.55	10.21	9.10
Sulphur .....	1.48	.50	trace.	1.62
Theo: Evaporative power .....	8.68	....	8.99	8.24

There are at several points in this district beds of oil shale, which may before long be found worth utilizing. Several beds of cannel coal have been found, one of which was for sometime worked on the property of the Acadia Coal Company, and yielded 126 gallons of crude oil to the ton.

There are four large and well-equipped collieries in this district. Their output is taken by the Londonderry Iron Works, local manufacturing, and railways, and considerable shipments are made by rail and from Pictou Harbor to Quebec and Montreal.

The coal measures are interrupted at New Glasgow by lower strata, but in the opinion of Sir J. William Dawson, and other geologists, the coal measures extend many miles to the north and north-west under the covering of the upper division of the carboniferous system. Possibly at some points this covering may be thin enough to permit of the coal being reached.

Small seams of coal are known all along the shores of the Bay of Fundy, but have not yet been worked.

The Springhill coal field lies north of the Cobequid Mountains, in Cumberland County, at the western extremity of the problematical coal field referred to in connection with the Pictou district. The northern edge of this coal field has been traced from the Joggins shore of Cumberland Basin, about 18 miles, to the Styles mine, but its deflexion to the south to join the Springhill coal mines district has not been followed. On the Southern or Springhill side of the basin there is a large and important development of coal seams. The productive measures stretch for many miles in a westerly direction to the Cumberland Basin at Apple River, but have not yet been prospected. Several mines have been worked on the northern out-crop at the Joggins, Maccan, &c., but the chief development has



been at Springhill by the Cumberland Railway and Coal Company, who have proved and extensively worked the following set of beds :—

	Ft.	In.	Ft.	In.
North Seam—Coal .....	13	..	..	..
Strata .....	..	..	105	..
Coal .....	5	..	..	..
Strata .....	..	..	130	..
Coal .....	2	4	..	..
Strata .....	..	..	185	..
Main Seam.....	11	..	..	..
Strata .....	..	..	80	..
South Seam.....	11	..	..	..
Strata .....	..	..	100	..
Seam .....	8	6	..	..
Strata .....	..	..	190	..
Seam .....	4	..	..	..
Strata .....	..	..	176	..
Seam .....	2	9	..	..
	57	7		

Their out-put is now at the rate of 350,000 tons per annum, and is largely used for steam purposes on Canadian railways, steam-boats, &c. The coal is also adapted for domestic purposes, and its coke is extensively used at the Londonderry Iron works.

The following analyses made by me some time ago will show the quality of the coal of this district:

CONTENTS.	North Seam.	Main Seam.	South Seam.
Moisture .....	1·625	·78	1·39
Vol. Combustible matter.....	28·672	31·32	31·22
Fixed Carbon.....	65·431	62·54	61·58
Ash .....	4·272	5·34	5·79
Sulphur .....	·783	1·38	·80
Evaporative power.....	8·99	....	8·46

The extent of country underlaid by the productive measures, is not yet clearly known, but has been estimated at 300 square miles. The district is intersected by the Intercolonial Railway ; and a branch railway runs from the Springhill collieries to Parrsboro, on the Bay of Fundy, where extensive shipping docks are being constructed.

The history of Nova Scotian Coal Mining is a short one. Early writers of Colonial history refer frequently to the Cape Breton coals, which, outcropping on the beaches and in the sea cliffs, formed a prominent feature in the landscape, and were mined by the French and English garrisons of Acadia, and by a few American smugglers. This state of affairs continued until the early part of the present century, when, after a few attempts at systematic mining, the minerals of the



Province were granted to the Duke of York, who transferred them to the London jewellers, Messrs. Rundle & Bridge, who sold them to the General Mining Association of London in 1827. This company commenced extensive operations at Sydney, Pictou, and the Joggins in Cumberland Co., and continued them until 1857. At that time arrangements were made with the Government whereby the General Mining Association surrendered their claims, except to certain large tracts in the various coal districts, and the public were allowed to open mines under leases from the Government. This arrangement led to the opening out of quite a number of collieries, and the sales increased from 226,725 tons in 1858 to 395,637 tons in 1862. Nova Scotian coal was at this time admitted into the United States free of duty, and the sales to this quarter were about 450,000 tons in 1865 and 1866 out of a total of about 595,000 tons sold. In 1867 the U. S. imposed a duty of \$1.25 a ton which in 1872 was lowered to 75 cents a ton. But the sales to the United States continued to diminish, until in 1885 they were only 34,483 tons. In the meantime, the consumption in Nova Scotia and the adjoining Provinces had been steadily increasing, until in 1885 the sales of Nova Scotia coal were as follows :—

Provinces of Nova Scotia.....	444,652
New Brunswick.....	148,634
Newfoundland .....	74,322
Prince Edward Island.....	52,770
Quebec.....	493,917
West Indies .....	5,732
United States .....	34,483
<hr/>	
Total (long tons).....	1,254,510

#### PETROLEUM.

Indications of this valuable mineral have been observed at Cheverie, Hants Co., in Pictou Co., and at Lake Ainslie in Cape Breton, but the result of explorations made in the latter locality have not proved satisfactory.

#### THE GOLD FIELDS OF NOVA SCOTIA.

The auriferous district of Nova Scotia stretches in an irregular band along its southern shore. Its area is estimated at about 3,000 square miles. The gold mines are scattered irregularly through this band, the greater number being to the eastward of Halifax. The auriferous districts are found to contain numerous veins of quartz from one inch to six feet in thickness, running continuously in many cases for several miles. Nearly all these veins contain gold, but, as elsewhere, only a certain percentage are rich enough to work. They carry the gold in visible grains imbedded in the quartz, and in the various sulphides of copper, lead, iron, etc., invariably found in them. The width of the veins usually worked varies from four to twenty inches, but in some cases they are found to be highly auriferous when much wider.

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These veins carry gold in amounts varying from a trace up to several ounces, and in common with auriferous veins of other countries, frequently present it in the form of "pay streaks" or rich zones in the vein. These pay streaks are of varied width and depth, and are frequently very rich. In the Sherbrooke district one of these rich deposits was followed to a depth of 600 feet. The quartz surrounding these richer portions of the veins varies in value from three to ten dollars a ton. Other veins again show a uniform yield, not exceeding one-half to three quarters of an ounce to the ton for long distances.

Among the more prominent districts at the present time may be mentioned the Salmon River Mines. Here work has been carried on for several years on a vein of quartz from three to six feet wide. Several shafts have been sunk to a depth of about 150 feet, and ore has been extracted from a portion of the vein about 900 feet long. The quartz is crushed in a stamp mill driven by water power, and placed about a quarter of a mile from the mine. There are eight batteries, each holding five stamps, weighing about 700 lbs. each complete. The average yield from the quartz has varied between 7 cwts. and one ounce to the ton. Owing to the size of the vein and the cheapness of the water power crushing, this ore could be profitably treated even if the value of the gold yield fell to five dollars, or say twenty shillings to the ton. Since the opening of the mine 33,253 tons of quartz have been crushed and yielded 18,047 oz. of gold. This mine can be taken as a sample of others now working in the Province, but it will be understood that the narrower the vein the richer its contents must prove, as the expense of mining increases rapidly with the greater amount of dead work. At Montagu, Rawdon, Oldham, Stormont, and Lake Catcha profitable mining has been carried on during the past year.

However tempting the prospects of the rich quartz veins may prove to the miner, the great future of gold mining in Nova Scotia, in my opinion, lies in the so-called "low grade" ores. In many of the districts are met wide belts of slate and quartzite, intersected by quartz veins, both the veins and the rocks being more or less auriferous. Experience in the Western States has shown that ore such as this, mined in large quantities and crushed and amalgamated in large mills of 75 to 100 stamps, pays well even when worth not more than \$5 a ton. Trials on a working scale have been made of such ores as they occur in this Province, and the field appears even more promising here than in any other gold mining country.

At Sherbrooke and Mount Uniacke large lots of this ore have been quarried and crushed in small mills, and the results have shown that such operations, if conducted on a large scale, with approved appliances, would pay well. The values of these crushings have averaged from 3 to 7 dwts. to the ton, and it can be safely asserted that nowhere can labor and the usual supplies of mining camps be procured more cheaply than in Nova Scotia.

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### ALLUVIAL GOLD.

In Nova Scotia, contrary to the history of most gold mining countries, alluvial work has played an insignificant part. It is generally believed that the causes, which have contributed to the present contour of the country, have swept all detritus away into the Atlantic. This is a mistake. Australian miners assert that bare rock surfaces are not more abundant in the district under consideration than in the gold districts of Australia. Small amounts of gold have been procured by alluvial work at Tangier, Waverley and Moose River, but no systematic attempts have been made to test the old river courses, or the still waters, etc., of the present drainage systems which run for the most part transversely to the strike of the veins. Many of the districts have a surface apparently rich enough to treat by sluicing and crushing, and several of the rivers are reported to give good tests.

At Gay's River, an ancient indurated sea beach or river bed lying on the auriferous measures, carries gold at the junction of the slates and conglomerate, and has been worked to some extent.

### MINING.

The veins dip at all angles and are invariably opened by shafts sunk on the dip of the vein. This is not perhaps quite according to mining text-books, but experience shows that it is best adapted to the veins and to the encasing strata of this country. The stopes are carried from shaft to shaft, a distance of from 80 to 200 feet, by underhand work, powder or dynamite being used. The firmness of the rocks makes the mines usually very dry, and the expense of pumping is small whenever the surface is properly drained. The cost of mining, there being little dead work, varies according to the size of the vein and the hardness of the encasing rock, from 50 cents a ton in the open cast work to \$15 a ton in the narrow and tight bound veins. The quartz is crushed in stamp mills similar in general construction to those used in other parts of the world. The stamps weigh from 450 to 750 lbs. and fall at the rate of from 30 to 50 drops a minute. Mercury is fed into the mortar in which the stamps work, at frequent intervals, and the coarse gold is amalgamated and retained around the dies in the bottom of the mortar. The mills in common use in the Province crush to a fine powder about a ton of quartz to each stamp, in a days' work; when quartzite and slate are being treated more rapid progress is made. The pulverised ore is carried by water through fine screens and over copper plates amalgamated with mercury for the purpose of arresting the fine gold.

As already mentioned, the veins always carry sulphides, etc., of various metals, which include considerable amounts of gold. This gold is but partially arrested in the mill or on the plates, and usually passes into the refuse tailings. Assays show that these tailings when concentrated, are often rich enough to warrant attempts being made to save the gold, but hitherto no systematic attempts have been made in this direction.

All the auriferous ground in the Province is the property of the Government, and it issues leases for three terms of twenty years. The areas are laid off in rectangular form, each area being 150 by 250 feet, with the shorter sides parallel to the general run of the veins and the beds of the district. The fee paid for each area is two dollars. Similar areas can be taken under prospecting licenses for the space of six months, on payment of a small registration fee. Provision is made whereby the holder of any lease can require by arbitration or by grant from the Government, the ground needed for mining purposes. In return the lessee is required, under risk of forfeiture, to employ forty days labor on each of his leased areas, and to make periodic returns of this labor, and of all quartz sent to a mill.

Any person desiring to build a quartz crusher must procure a license therefor, and give bonds for the due discharge of his obligations, which are to keep an account of all quartz crushed, and to pay to the Government the royalty on all gold extracted. This royalty is at the rate of two per cent. on unsmelted gold valued at \$18 an ounce, and at the same rate on smelted gold valued at \$19 an ounce. By this arrangement the miner having delivered his quartz to the mill owner is free from any responsibility about the royalty, as the Government looks to the licensed mill owner for it.

The statistical tables at the end of the report show the yield of each district during the past year, and a summary of the returns since the compilation of statistics was commenced.

### IRON ORES.

This, perhaps the most important of our mineral resources, has not as yet received attention at all commensurate with its value. The ores are of the most varied species and frequently very pure. They are generally accessible, near water or railway transport, and none of them at any great distance from coal. Beginning at the western end of the Province, titaniferous iron sand is met at St. Mary's Bay, and the trap rocks forming the south side of the Bay of Fundy yield abundant indications of specular and magnetite. At Clementsport and Nictaux are beds of red hematite and magnetite, formerly worked to a small extent in charcoal furnaces. From this point as far west as Windsor, specular, red hematite and bog ores are found, but little is known of their extent or value. Similar ores, sometimes highly manganiferous, are met between Windsor and Truro, at Goshen, Maitland, Brookfield, etc. The following analysis of limonite from the last named place is of a very pure ore:—

Water.....	11.36
Silicious matter.....	1.54
Phosphoric acid.....	trace.
Sulphuric acid.....	none.
Magnesia.....	trace.
Metallic iron.....	60.00

On the north side of the Bay of Fundy the limonite ores of Londonderry are well known. Their passage has been traced for fifty miles along the range of the Cobequid Hills, and they have been worked for many years at the Acadian Mines. Large amounts of a variety of spathic ore are mined and smelted with the limonite, and a good grade of pig made, part of which is converted into bar iron, etc. There are two large blast furnaces, with rolling mills, foundries, etc., and from 40,000 to 60,000 tons of ore are annually smelted. The following analysis will show the character of the iron ores, and of the iron made at this establishment:—

	Micaceous Hematite.	Limonite.
Per oxide of iron.....	96.93	82.65
Oxide of manganese.....		.25
Alumina .....	.33	.56
Lime .....	.04	.15
Magnesia.....	.11	.10
Phosphoric acid.....	.07	.38
Sulphuric acid .....	.03	.02
Water hygroscopic.....	.03	.31
Water combined.....	.79	10.51
Insoluble.....	1.26	4.79
Metallic iron .....	67.85	57.85

*Spathose Ore (Sideroplesite.)*

Insoluble silicious matter.....	.47
Calcic carbonate.....	.59
Ferrous " .....	69.20
Manganous " .....	1.37
Magnesian " .....	28.73
Ferric oxide.....	.08

Analysis and tests by Riehle Bros.

Bar iron ductile and fine grained. Tensile strength. 60,000 lbs. per square inch, and elongation 33 per cent.

	No. 1 Pig.	Sieman's best Bar Iron.
Silicon.....	3.621	.280
Graphitic carbon .....	3.730	....
Combined carbon .....	.390	.096
Sulphur .....	.002	trace.
Phosphorus.....	.198	.035
Manganese .....	1.126	.041
Iron.....	90.933	99.548

Iron ores are known at Pugwash, Wallace, Joggins, Clark's Point, etc., north of the Cobequid Hills.

The Londonderry iron ore bearing ground passes north of Truro and extends into Pictou county, and may be said to terminate at Cape George in Antigonish county. On entering Pictou county near the line of the Intercolonial Railway, are met widespread indications

of specular ore, which at several points show veins of workable size. This specular ore ground extends to the head of the East River, a distance of about twenty miles, and carries ore veins, which, as proved on the Watson and Weaver properties, attain a thickness of fifteen feet. South of this band are deposits of limonite ores, which, however, are yet little known. In the vicinity of Springville, between the specular ore and the Pictou coal field, are large and valuable beds of limonite, sometimes highly manganiferous, and bedded red hematites attaining a thickness at some points of from 20 to 40 feet. Among the more prominent localities holding these ores may be mentioned Springville, Bridgeville, Blanchard, Little Blanchard, Webster's Mountain and Fall Brook. On Sutherland's River these ores approach the eastern end of the coal field, and the Watson ore bed at Fall Brook is about two miles from the Vale colliery, and is about fifteen feet in width. Still further east near the line of the New Glasgow and Cape Breton Railway are deposits of spathic iron ore and of clay ironstone. These ores extend for many miles, until the measures carrying them are cut off by the Gulf of St. Lawrence. An exposure of a bed of red hematite three feet thick at Arisaig marks the termination of this district, which is fifty miles long, and attains a maximum width of about six miles. Clay ironstone is met at several points in the Pictou coal field and between New Glasgow and Pictou.

The following analyses will show the character of the Pictou iron ores:—

	Limonite.	Clay Ironstone	Specular.	Red Hematite.
Water .....	7.702	2.132	.....	.....
Iron Peroxide.....	87.925	45.361	97.52	65.26
Alumina .....	trace.	16.962	.....	5.59
Silica .....	3.000	.780	3.20	25.68
Manganese Binoxide.....	trace.	.....	.....	.....
Lime .....	do.	trace.	.91	1.88
Magnesia .....	.500	1.655	.....	1.05
Sulphur .....	trace.	.612	.06	.....
Phosphorus .....	do.	trace.	trace.	.....
Metallic iron .....	65.54	35.00	68.33	43.4
Carbonic acid .....	.....	.....	.....	.....

The following analyses is of the spathic ore from Sutherland's River:—

Sesquioxide of iron.....	20.52
Carbonate of iron .....	57.40
Carbonate of manganese .....	8.29
Carbonate of lime.....	4.02
Carbonate of magnesia.....	5.60
Silica .....	2.38
Moisture .....	1.43
Sulphur .....	none.
Phosphorus .....	none.
Iron .....	42.07



It may be remarked that in Pictou county the conditions for making iron and steel cheaply are unsurpassed, as within a few miles are collected numerous iron ores, fluxes, and good furnace fuels, and there is railway and water communication with all parts of the Dominion.

In Cape Breton indications of valuable iron ores are frequently met, but hitherto there has been little inducement to test or develop them. Near East Bay a bed of red hematite ore from 4 to 13 feet wide has been traced several miles. The following analysis of it is from the records of the Geological Survey of Canada:—

Iron Peroxide .....	85.057
Silica .....	5.130
Sulphur .....	.075
Phosphoric acid .....	.032
Metallic iron .....	57.526

At Whycogomagh, on the Bras d'Or Lake, several beds of red hematite and magnetic iron ore have been followed for some distance, by trenches and natural exposures. Both these deposits are close to good shipping places.

Louisburg, Gabarus, Big Pond, Lake Ainslie, and St. Peter's, among other localities, may be mentioned as likely to contain valuable ores.

The conditions upon which iron ore lands are leased by the Government are similar to those regulating the coal properties, and will be referred to further on.

There are numerous localities yielding iron ores beside those I have briefly touched upon. Among these may be mentioned Salmon River Lakes, Boyleston, and Manchester, in Guysboro' county, where valuable deposits of specular ore have been superficially tested. At Stewiacke, Riversdale and Musquodoboit are ores of red hematite and limonite, while at numerous points over the Province are deposits of bog iron ore, often of good quality, and a valuable accessory to local smelting operations.

## COPPER ORES.

Indications of copper ore are widespread throughout the Province, and although promising at several points, explorations have, in a few instances only, been pushed far enough to show workable deposits. The trap of Annapolis and Kings counties shows native copper, with carbonates, etc. Among the more promising localities may be mentioned Margaretsville, Digby, and St. Mary's Bay, Cape d'Or, etc. The carboniferous measures of Pictou, Cumberland, and Antigonish counties frequently show deposits of the vitreous sulphide and of carbonate of copper, and some of them may prove valuable. At several points in this district small lots of rich ores have been exported, but no attempts have been made at systematic work.



In the vicinity of College Lake, in Antigonish county, several valuable deposits of copper pyrites have been thoroughly tested. It is believed that large amounts of ore running from three to eight per cent. can be obtained here, but the depression in the copper trade has prevented development. In Cape Breton the precambrian felsites frequently show copper pyrites. These have been prospected with promising results at Gabarus and French Road, and at Coxheath near Sydney. At the last named locality a large amount of work has been done, showing the presence of immense masses of ore carrying from 3 to 8 per cent. of copper. Preparations are now being made to smelt these ores into a matte, a business for which the locality affords every facility in the way of fuel, fluxes, shipping ports, etc. Other localities are Cape North, Cheticamp, East Bay, Benacadie, etc.

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### LEAD ORE.

In this Province the only source of galena appears to be the carboniferous marine limestone series. At Gay's River, Shubenacadie, and Stewiacke it is frequently met in these rocks. At Smithfield, Upper Stewiacke, the limestones carry at several points large masses of galena, with copper and iron pyrites and calcite, and small amounts of silver are reported to be present in the galena. Preparations are being made to erect experimental smelting works at this point, as it is believed that an abundant supply of ore can be secured.

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### ANTIMONY.

This ore is known at several localities in the Province, but has hitherto been worked only at Rawdon, Hants county. Here a vein from 6 to 20 inches in width has been successfully worked during the past two years, and has yielded a very pure ore, all of which has been exported to England. The exports during the year 1884 were 463 tons, valued at \$17,865, and during the year 1885, 758 tons, valued at \$33,095. At present only the higher grade ore is shipped from this mine, and the accumulations of low grade ore await treatment. At the New Brunswick antimony mines this was largely smelted at a central furnace, and no doubt a similar plan could be advantageously adopted here.

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### MOLYBDENUM.

This mineral occurs at Gabarus in Cape Breton, and at Hammond's Plains and Musquodoboit in Halifax county. Small lots have been shipped from the first named locality, but no demand has yet risen to warrant attempts at its regular extraction.

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## NICKEL AND COBALT.

These elements occur in small quantities in the associated minerals of our auriferous veins, etc., and some of the iron sulphides occurring in the upper horizons of the lower cambrian hold them in notable amounts. Hitherto no attempt has been made to ascertain if they can be turned to any account.

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## MANGANESE.

There are numerous localities in the Province which have yielded rich deposits of these ores. At Tenny Cape, Hants Co., Onslow, Colchester Co., and Salmon River, Cape Breton Co., small shipments are annually made of very rich ore, containing from 89 to 98 per cent. of binoxide, with mere traces of iron. The exports are principally to glass makers in the United States, and the ore brings from \$75 to \$100 a ton at the mines. Few shipments are made of the low grade ores, which are abundant, and a large trade could be done if a start were once made. Among other localities may be mentioned Pictou, Bridgeville, and Glengarry, Pictou Co., and Amherst, Cumberland Co.

Beds of wad, or bog manganese, are found at numerous points, but hitherto it has not proved profitable to export them.

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## GYPSUM.

This mineral occurs in the Province as soft or hydrated, and as hard or anhydrous gypsum. It is exposed in beds, varying in thickness from a few inches up to 200 feet, and is also found in fine grains and veins in the shales, marls, and limestones which are usually associated with it. In the Maritime Provinces it occurs in the carboniferous marine limestone formation, already referred to in connection with the manganese ores, and wherever the limestones appear it is usually at no great distance. It is so widely scattered through the northern and eastern parts of Nova Scotia that a detailed list of its exposures could not be given. It has been mined chiefly at Windsor, Cheverie, Walton, Maitland and Hantsport on the Bay of Fundy, and at Port Hood, Port Hawkesbury, Lennox Passage, Baddeck, and St. Ann's, in Cape Breton. Among the minerals found in the gypsum may be mentioned glauber salt, common salt, magnesium carbonate, sulphur, and several varieties of borates, similar to the Peruvian Ulexite and "Tiza." Should these borates be found in any amount in our gypsum beds they would undoubtedly prove of great value.

The Nova Scotian deposits of gypsum are on an unequalled scale, the beds being frequently traceable for miles by exposures presenting faces 50 feet in height. In Antigonish Co. it occurs on St. George's Bay as a crystalline cliff, 200 feet high, and similar exposures are met at

Plaster Cove, Mabou, and many other localities in Cape Breton. This scale of exposure, and frequent proximity to good shipping places, has materially aided the out-put of the mineral, and it can at many points be placed on board for 50 or 60 cents a ton.

The anhydrite is found imbedded in the soft gypsum, but is seldom exported. The exports of gypsum are almost entirely to the United States, where it is ground as a fertilizer, or boiled and ground for finishing houses, cornices, etc., according to its purity and color.

It is said to be a suitable dressing for tobacco and cotton lands, and large quantities are mined for this purpose in Virginia. The gypsum is used to a very limited extent in Nova Scotia for agricultural purposes; in fact in our best farming districts nature has disseminated this useful fertilizer very freely. A large mill in New Brunswick supplies the local market with the prepared article as required for architectural purposes. The annual exports, chiefly from Windsor and its vicinity, on the Bay of Fundy, vary from 80,000 to 140,000 tons, valued at about 95 cents a ton.

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#### MINERAL PAINTS.

As might be anticipated in a country yielding iron and manganese ores, the different varieties of ochres and umbers are frequently met. Among the various localities yielding these mineral paints may be mentioned Londonderry, Onslow, Stewiacke, Maitland, Chester and Kentville. Small amounts are dried and ground for local use, but the trade is almost exclusively supplied from foreign sources.

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#### BARYTES.

This mineral occurs at Five Islands, Bay of Fundy; River John, Pictou Courty, and at Stewiacke, Colchester County. At the latter place about 300 tons were mined last year, and was worked up at Halifax in the manufacture of paints, etc.

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#### MINERAL WATERS.

At numerous localities through the Province mineral springs have been known for many years, and are used for various complaints. Few of these waters have been analysed, but they are worthy of careful examination, as the presence of mineral waters of undoubted excellence has frequently done much to attract visitors, and produce benefits important if not conspicuous.

In the gypsiferous districts brine springs are frequently met. Some of the springs in the early days of the settlements were utilised by those living in the vicinity, and considerable amounts of salt manufactured for home use. Now the imported salt has so lowered prices

that salt-making has ceased to be a provincial industry. The presence, however, of these brine springs is of importance in relation to the possibility of beds of salt being connected with the gypsum beds. Should examination prove this to be the case, a large and valuable industry would be revived. The same speculative interest attaches to the instances of sulphur occurring in the gypsum and gypsiferous marls.

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## BUILDING STONES.

The building stones of Nova Scotia are principally granite and sandstone. The various grades of the latter are procured principally from the upper divisions of the carboniferous system. Pictou, Colchester, and Cumberland Counties, therefore, are the principal producers. Many of the quarries in these counties have yielded stone for the construction of the public buildings of the Maritime Provinces, and of the New England cities. The granite of Halifax, Shelburne, and Ship Harbor is of excellent quality, and is largely used in foundations, steps, etc. Among other building material may be mentioned marble from Cape Breton, and limestone from Pictou and Antigonish Counties. The celebrated fortress and city of Louisburg was largely constructed of local crystalline diorite.

Slates of excellent quality occur in large quantities at Rawdon, Hants Co., and at several other localities, but at present they are in little demand, as roofs are covered with wooden singles.

Brick Clays of excellent quality abound in many places, and are worked to a small extent. The cheapness of wood has hitherto retarded the introduction of brick as a material for building purposes, except in the towns. However, brick buildings are gradually coming into more general favor, and a new market has been opened up in the manufacture of drain tiles, which are used in large quantities.

Among miscellaneous minerals may be mentioned plumbago, fire clay, refractory stone, soapstone, felspar, kaolin, infusorial earth, etc. These are known to exist in the Province at numerous points, and in quantities admitting of economic development, but at present the demand is not large enough to direct particular attention to them.

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## TENURE OF MINERAL LANDS.

The grant of lands to the early settlers in this Province contained no regular reservation of minerals, in some instances gold, silver, and precious stones only were reserved, in other cases the gold, silver, iron, copper, lead, etc., were retained for a source of revenue to the Crown. After the agreement with the General Mining Association, the Government passed an Act by which they retained in previous grants the gold, silver, coal, iron, copper, lead, tin and precious stones whenever reserved, and for the purposes of revenue made the above reservations in all future grants. This Act releases to the owner of the land all

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gypsum, limestone, fireclay, barytes, manganese, antimony, etc., etc., and any of the above reservations, whenever they are not specified in the grant. There is no complete list published of all the grants, but information as to every grant can be obtained at the Crown Lands Office. The Department of Public Works and Mines is charged with the collection of revenue from the mines, the enforcement of the Mines Regulation Act, etc. Reference has been already made to the mode of granting gold licenses and leases, and the same remarks apply to silver and its ores. For all other minerals held by the Government for revenue purposes a somewhat similar system is adopted.

On application a tract not exceeding five square miles, called a License to Search, can be obtained for one year at a cost of \$20. Out of this the applicant may select, before the expiration of the term of one year, a tract of 640 acres, (one square mile,) for which he pays \$50. This is termed a right to work, and lasts for two years, and can be renewed for a further term of one year, on payment of \$25. During the existence of this right to work, the holder, if he commences *bona fide* mining operations, is entitled to a lease for twenty-one years, and renewals for three further terms of equal length. Provisions are made for securing the surface ground needed for mining, for proper returns, and for forfeiture on neglect to comply with the requirements of the lease, etc.

All the regulations connected with the leasing and working of the Provincial mines are framed with the view of affording all proper and necessary facilities to those desirous of entering into mining operations, and among not the least of these advantages may be mentioned the security of the title granted and registered by the Government.

The following are the rates of royalty paid by those holding under the Government :—

Each licensed mill owner shall pay or cause to be paid, in money, in weekly or other payments, as the Commissioner of Mines shall order, to the Commissioner or to the Deputy Commissioner for the district, a royalty of two per cent. on the gross amount of gold obtained by amalgamation or otherwise in the mill of such licensed mill owner, at the rate of nineteen dollars an ounce troy for smelted gold, and eighteen dollars an ounce troy for unsmelted gold, and of two per cent. on the silver, at the rate of one dollar per ounce troy.

*Coal.*—Seven cents and one half of a cent on every ton of two thousand two hundred and forty pounds of coal sold or removed from the mine, or used in the manufacture of coke, or other form of manufactured fuel.

The words "removed from the mine," in the preceding section, shall not be held to apply to coal used for domestic purposes by the workmen employed in and about each mine; nor to coal used in mining operations in and about the mine from which such coal has been gotten; but coal so used shall not be liable to pay royalty.

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*Copper.*—Four cents upon every unit, that is, upon every one per cent. of copper contained in each and every ton of two thousand three hundred and fifty-two pounds, of copper ore sold or smelted.

*Lead.*—Two cents upon every unit, that is, upon every one per cent. of lead contained in each and every ton of two thousand two hundred and forty pounds, of lead ore sold or smelted.

*Iron.*—Five cents on every ton of two thousand two hundred and forty pounds of ore sold or smelted.

*Tin and Precious Stones.*—Five per cent. on their values.

## COAL TRADE.

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The total sales for the year 1885 amounted to 1,254,510 tons, made up of 778,378 tons of round, and 247,676 tons of slack coal, and 228,456 tons of run of mine coal, as compared with 1,261,650 tons sold during the year 1884, comprising 945,518 tons of round and 316,132 tons of slack coal.

The following are the most noticeable points in the coal trade:—

The home sales were 444,652 tons compared with 493,050 tons in 1884, and 471,327 tons in 1883.

The Province of Quebec took 493,917 tons, against 396,782 tons in 1884, and 410,605 tons in 1883.

The sales to New Brunswick were 148,634 tons, compared with 158,420 tons in 1884.

Newfoundland took 74,322 tons, against 86,216 tons in 1884.

The sales to Prince Edward Island were 52,770 tons against 50,399 tons during the preceding year.

The West Indian sales have again decreased, being 5,732 tons against 9,595 tons during 1884, and 31,860 tons in 1883.

The sales to the United States were made up of 10,497 tons of round and 23,986 tons of slack coal, against 64,515 tons in 1884. These sales to the United States are the smallest recorded since the year 1850.

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## CUMBERLAND COUNTY.

The total sales of this county amounted to 340,535 tons against 258,405 tons in 1884, and 222,347 tons in 1883.

The home sales were 83,953 tons, against 59,502 tons during the preceding year.

The sales to New Brunswick were 92,872 tons against 93,724 tons during 1884.

The Province of Quebec took 163,303 tons, as compared with 104,243 tons in the year 1884.

## COLLIERIES.

*Chignecto*.—During the past year a few men were employed at this mine, and the air ways, levels, etc., were kept in repair. The output was 6,084 tons.



*Joggins.*—Work has been continued in the new slope, and the levels are now over one thousand feet to the eastward. The seam presents the following section :—

	ft.	in.
Top coal .....	3	6
Fire clay.....	1	6
Bottom coal .....	2	0
	<hr/>	<hr/>
	7	0

A new furnace 7 feet by 5 feet above the bars has been put up, with a column of 100 feet. The output of the mine was 17,664 tons against 25,034 tons in 1884.

*Minudie.*—During the shipping season work was continued as usual at this mine, and the output was 7,702 tons as compared with 10,023 tons during 1884.

At the Milner Mine a little work was done, and Mr. S. E. Freeman, during the fall, opened out the slopes in the old Lawson Mine, and extracted some coal.

*Springhill.*—The operations of the Cumberland Railway and Coal Company have been pushed with their usual enterprise. The sales for the year are the largest for any single company, being 335,055 tons, against 232,481 tons during the preceding year. The development of the South slope has been continued, and further exploratory work carried on in a recently acquired property lying to the south east of it. The underground operations have been continued as usual.

The Company are now preparing to extend their railway from its present terminus at Parrsboro Village to the mouth of the river, and to construct at that point a dock for coal shipments on a large scale. This arrangement, when completed, will provide an outlet which will probably assure the control of the Bay of Fundy and the St. John coal trade to this district.

The Saltsprings Colliery engine house was burned down during the summer, and the company have not resumed work. Mr. W. Patrick continued opening out his mine at Maccan, which yields a coal of very superior quality, and is now prepared to ship steadily.

## PICTOU COUNTY.

The total sales were 396,000 tons against 464,181 tons in 1884.

The home sales were 209,428 tons, against 262,780 tons during the preceding year.

The Province of Quebec took 145,363 tons, compared with 139,934 tons in 1884.

The sales to Newfoundland, Prince Edward Island, and New Brunswick remain about the same as in 1884.



## COLLIERIES.

*Acadia.*—Work has been continued with customary regularity. The new pump has been found to work well. As it is the heaviest single lift in America, the following notes will be of interest:—

The mine is opened by a slope 2400 feet long, vertical depth 1000 feet. The pump is a Knowles of the duplex compound condensing type, with high and low pressure steam cylinders, 12 and 22 inches in diameter, 24 inch stroke with four 5½ inch plungers working against a head of 435 lbs. per square inch. The column is six inches in diameter, of wrought iron, the air chamber is 30 by 15 inches, the steam pipe, 2600 feet long, and four inches in diameter takes the steam from Babcock boilers on the surface, at a pressure of 105 pounds. The pipe is protected with an infusorial earth jacket, the material being taken from a local deposit. After a year's service this pump has given no trouble, and no joints have leaked. There is no suction on the pump, the lower valves being below the level of the pump. The pump usually makes 10 double strokes a minute, but could run 25 strokes, equal to 100 feet piston speed a minute. A small hydraulic ram will raise the water from the lower level to the pump.

*Albion.*—There is little new to be noticed at these works during 1885. The McGregor pit was closed during the summer, as the coal trade was dull. The slack from the Third Seam was used at the Coke ovens and found to answer well. During the past season new ropes were put in the Foord Pit Shaft, and the level of the water was lowered by tanks. By utilising the plant at this point, the expense of new pumping gear in the Third Seam winnings is obviated. The output was 129,195 tons against 201,557 tons during the preceding year.

*Intercolonial.*—The main slope is now 2650 feet long, the underground engine hauling 950 feet, and the surface engine hauling the remainder of the distance. During the summer a tendency to "creep" which showed itself on the 1700 feet level was checked by cutting out a few pillars. No work was done in No. 4 Slope, and in the new pit. The output was 109,139 tons compared with 120,656 tons in 1884.

*Montreal and New Glasgow.*—During the year 1885 a little work was done on this area by Mr. Muir, and the coal extracted was favorably received in the New Glasgow market.

*Vale Colliery.*—Operations in the McBean Seam were interrupted for a short time by a serious accident, attended with much loss of life. From examinations made by me, I was led to believe that the ignition and explosion of a comparatively small amount of gas was extended by the combustion of coal dust. More particulars will be given further on in the report. The results of the investigations made by me and Mr. Madden, Deputy Inspector, are given by him in his report.

The Six Feet Seam is now opened and in full working order. A very fine pair of winding engines has been put up, with the necessary

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heapstead, screens, branch railway, etc., and will prove an important factor in the future coal trade of the district. The output was 76,125 tons against 73,529 tons in 1884.

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### CAPE BRETON COUNTY.

The total sales during the past year from Cape Breton County were 517,975 tons, compared with 539,064 tons in 1884.

The home sales were 151,371 tons, compared with 179,768 tons in 1884.

New Brunswick took 28,498 tons against 39,463 tons in 1884.

The Newfoundland sales were 69,833 tons, compared with 83,143 tons during the preceding year.

The sales to Prince Edward Island were 13,613 tons against 19,056 tons in 1884.

The sales to Quebec show 215,254 tons, compared with 152,605 tons in 1884.

The West India trade showed only 5,618 tons against 21,872 tons during the preceding year.

The trade with the United States was only 33,788 tons, compared with 62,565 tons in 1884.

### COLLIERIES.

*Sydney.*—Operations at this colliery were interrupted last spring by a serious fire, which was only extinguished by tapping the metal tubing of the shaft, and drowning out the district in which the fire was situated. In the fall an opening was made into the Francklyn submarine lease, and operations will be continued as far to the rise as the cover will permit. The output was 124,274 tons, against 149,378 tons in 1884.

*Victoria.*—This mine may now be considered in full working order, the output for last year being 47,614 tons. Surveys have been made for the extension of the railway about 2½ miles to the Barasois, where an opening is being made on the Barasois seam. Should the road ultimately be extended to Lingan, and the artificial harbor at the latter place be abandoned, the company will be in a position to meet any demands for coal at their pier at the South Bar.

*Lingan.*—Work here presents no new features of interest. The output was 21,761 tons, compared with 23,404 tons in 1884.

*Reserve.*—Work has been continued briskly at this mine during the past season. The dip slope has reached the Emery Seam, and preparations are being made to win out pit room. The engines, shops, etc., having been concentrated at the Reserve Mine, the company will

be able readily to carry out their plan of working all the areas from this point. The output was 83,276 tons, against 87,216 tons in 1884.

*International.*—Operations at this mine present no new features. The main dip is now 2000 feet in length, and the levels are being steadily advanced to the east and west. A new shop for locomotive and other repairs, and a new office, have been erected. The output was 67,959 tons, compared with 87,485 tons in 1884.

*Bridgeport.*—Mr. Henry Mitchell has completed fitting up his colliery, and is now ready for steady work. During the past season he raised 13,178 tons of coal.

*Little Glace Bay.*—No change has been made in the operations of the mine. The output was 39,400 tons, compared with 36,138 tons in 1885.

*Caledonia.*—The extraction of coal has been continued in the pillars. A dip plane has been driven down a short distance west of the pit bottom, and the coal is raised by an underground engine. The output was 58,859 tons against 69,461 tons in 1884.

*Ontario.*—A little work was done in the upper level of this mine, and a few cargoes shipped.

*Block House.*—The work of extracting pillars was continued during the summer, and was facilitated by the dryness of the season. The output was 11,075 tons against 22,668 tons in 1884.

*Gowrie.*—A pair of dip slants are being pushed from a point east of the new shaft, and have opened up a fine tract of coal. The question of utilising slack coal is being tested by the Messrs. Archibald. They have erected a Yeadon patent Briquette machine. Roughly speaking, the operation consists in thoroughly mixing the slack with pitch and compressing it into bricks under a heavy pressure. Mr. Charles Archibald writes :—

“The Briquette Plant is capable of making fifty-four tons of briquettes in ten hours. The weight of each brick is about 11½ lbs., and we allow 195 bricks to the gross ton (2240 lbs.) The briquettes are made from the fine coal and eight to nine per cent. of coal tar pitch. This fuel is particularly adapted for steam purposes, and is most suitable for locomotives. It is easy on fire bars and leaves fine ashes. We expect to get a market in the West Indies and South America as well as a market in the Dominion.”

The output of the mine was 74,414 tons against 89,384 tons in 1884.

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## GOLD.

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The returns show that 157,421 days' labor were performed, and that 28,890 tons of quartz were extracted and crushed, yielding 22,203 oz., 12 dwts. of gold, during the year.

I am pleased to be able to state that the anticipations of a good year's work, ventured in my last report, have been verified, the yield having exceeded that of the preceding year by 6,124 ounces, and being the largest recorded since the year 1867, at which period the yield was:—

1865.....	25,454 ounces.
1866.....	25,204     "
1867.....	27,314     "

Encouraging as this may appear, it is still evident that when a comparatively small production, such as this is considered, the failure of one or two productive mines will seriously affect the year's total. Since the year 1862 the total annual production has varied between 7,275 and 27,314 ounces, an amount totally out of proportion to the known richness of many districts, and the extent of auriferous ground. I would strongly urge upon our gold miners the importance of testing and developing all possible supplies of low grade ore. Several districts are known to contain large bodies of such ore, and in this country, with its abundant water power, cheap supplies and labor, and its favoring climate, gold mining must, in my opinion, seek its future expansion in this branch of the business.

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## DISTRICTS.

**CARIBOU.**—The returns for 1885 show that 2,239 tons were crushed, yielding 1,335 ounces, as compared with 1,559 tons yielding 966 ounces in 1884. There was some work done by Mr. Touquoy, and by Mr. Wright on the Heatherington property. The Lake lead, opened during the preceding season, was worked successfully.

At **MOOSE RIVER** a good deal of work was done by tributors on the little North lead on the Moose River gold mining property. Mr. Touquoy prospected to the west of this property, and found a new eight inch lead, good for about one ounce to the ton.

**DARR'S HILL.**—The Dufferin Gold Mining Company have concluded a highly satisfactory year's work. The main shaft is now about 150 feet deep, and toward the east the vein has been found to increase in width and richness. There were 10,880 tons of quartz crushed, yielding 4,924 ounces of gold, the total yield being to the

end of 1885, 18,047 ounces from 33,253 tons of quartz. Another equally promising lead has been found here.

**FIFTEEN MILE STREAM.**—The operations of the Hall, Anderson Company were continued on the lodes referred to in previous reports, until midsummer, when work was stopped. Mr. Hudson continued working, and steady returns have been made from his property, and it is to be hoped that the regularity and persistence of his operations will again bring this district into the prominent position it merits.

**GAY'S RIVER.**—A little work was done here at one or two points.

**MONTAGU.**—During the year 1885 the New Albion Gold Mining Company continued to work the DeWolf and Twin leads. The returns show that 2,809 tons yielded 4,001 ounces, placing this district second in the rank of the gold producing localities of the Province.

The deepest shaft, No. 1, on the DeWolf lead, reached a depth of 150 feet, and stopes were carried along the vein for a distance of about 700 feet. On the Twin lead stopes were driven about 500 feet, the main shaft being 150 feet deep. During September a very rich paystreak was struck, which yielded 1,369 ounces from 337 tons of quartz. As is not unusual, the quartz surrounding this streak proved during the remainder of the year, comparatively low grade. Operations in this lead have been continued, and the Twin lead is proving richer. A new lead called the Iron lead is being opened up.

Some prospecting was done by Mr. Oakes and others to the south of the New Albion area.

**OLDHAM.**—Mr. McDonnell and others continued their shaft, referred to in my last report, to a depth of 200 feet. In the fall operations were discontinued, pending the erection of steam power for more efficient pumping and hoisting purposes.

Mr. Hardman continued working to the westward of Mr. McDonnell, and has opened up an unusually rich lead, promising large amounts of mill ore. He has perfected his arrangements for pumping and hoisting at his main shaft, by power generated by a motor driven by the water power at his crusher, distant about one half a mile. Some quartz was taken out by the Messrs. Donaldson and others, but the principal operations were confined to the points referred to. The returns show that 1,170 tons of quartz yielded 2,360 ounces of gold.

**RENFREW.**—Mr. Hayward continued to work the Empress Mine and is now getting into excellent ground. Crushing was at a standstill during great part of the season, owing to an unusually dry spell. Mr. D. A. McDonald and Mr. Rae also did some work. The returns show a yield of 639 ounces from 641 tons of quartz.

**SHERBROOKE.**—Operations in this district present few points of interest. The depression which characterised the season of 1884 has continued, the returns for the past year showing 1,238 ounces from 2,426 tons of quartz. Although several veins on the north dip have

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been worked to a considerable depth, the belt hitherto operated is a narrow one, and it is to be hoped that fortunate discoveries may increase the width of productive ground. In view of the depth to which the northerly dipping veins have been followed, it hardly appears possible that the gold in the south dipping veins can be exhausted at the shallow depth to which they have been worked.

In the early part of the season Mr. Williams worked in the New York and Sherbrooke areas, and Mr. Cameron opened a small lead north of the former workings on the Wellington. The big pump was started to take out enough water to permit a test of a lead lying close to the Dewar. Work was also done on the Caledonia and Alexandria properties by Messrs. Brown, McNab and others. Mr. G. May did some work on the Meridian, in the old seven feet workings. On the Pactolus some work was done in the untried ground to the west of the open cut.

At Cochran Hill a little work was done by Mr. Cumming, and in the fall Mr. R. P. Fraser repaired the mill at the Crow's Nest, and resumed work, and also tested several promising new leads.

STORMONT.—The Gallagher Gold Mining Company continued mining on the leads referred to in previous reports, but on a smaller scale. A lead was opened at the mouth of Country Harbor, and preparations made for systematic mining.

TANGIER.—This district has shown little improvement last year. In the spring some work was done by the Essex Company, and work was continued on Strawberry Hill by Mr. Townshend. Mr. J. Irvine continued working at Mooseland.

In the spring a little work was done on the Pittsburg area, and in the fall the discovery of a large and rich lead was reported from Clattenburg's Brook, West Tangier.

UNIACKE.—The returns show that 576 ounces were extracted from 2010 tons of quartz, an average of 57 dwts. Operations were continued by Mr. Davidson, Mr. Prince, and others, but no new work of interest was performed.

WAVERLEY.—In this district Mr. Huff continued prospecting, and in the fall opened a lead on American Hill, which promised well. Some work was done on the veins near the western mill.

UNPROCLAIMED, ETC.—At Wine Harbor, Mr. Colchester worked on a lead yielding about 15 dwts. to the ton.

YARMOUTH.—The Kemptville mines have been successfully operated during the past year, and the district has proved the most promising of any yet opened to the west of Halifax. The returns show 624 ounces from 133 tons of quartz.

Some work was also done at Pubnico, a trial lot yielding 64 ounces from 5 tons of quartz.

At Lake Catcha work was continued by the Oxford Company on the leads already opened, and leads in areas 227 and 228 were worked. Other parties are making preparations for work, and it is anticipated that the year 1886 will show an improvement in the returns from this district.

At Millipsigate, Messrs. Hall and Owen, and others worked on leases 311, 282, and 284.

At Whiteburn (Caledonia), Queen's County, the Messrs. McGuire have opened up a lead on their property to a depth of about 20 feet, and have taken out some unusually rich quartz yielding at the rate of 17 ounces to the ton. They have made arrangements to put up a steam mill, and to begin regular work in the spring. Messrs. Hall, Owen, Barss, and Messrs. Cole, Telfer and Annand, prospected the ground north of McGuire's, and proved about ten gold bearing leads from 4 to 12 inches in width. Trial crushings of quartz from some of the larger veins showed 3 ounces to the ton. These leads will be worked in the spring. Prospecting was also carried on at Brookfield.

RAWDON.—Mr. McNaughton has continued working the Sims lead, which has been opened over a length of about 900 feet. The returns show 1,173 tons crushed for a yield of 2,759 ounces. Some prospecting was done in the vicinity of this mine, and there appears to be a large extent of auriferous ground in this district.



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## IRON MINING.

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During the year 1885, the operations at the Mines of the Steel Company of Canada were continued as usual. Large quantities of the white "Spathose" ore were extracted from the west mines. Promising bodies of ore were opened up to the east of the Folly Mountain Mines.

At Bridgeville, on the East River of Pictou, further explorations were made on the Saddler area, by Mr. J. H. Bartlett and Mr. R. P. Fraser, of Pictou. Mr. William Grant also mined about 80 tons of limonite, part of which was shipped to the Londonderry furnaces.

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## GYPSUM.

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Operations were continued as usual in the quarries in the Windsor district, but the exported tonnage was less than in the preceding year. The Messrs. McCurdy of Baddeck, shipped some plaster from St. Ann's Harbor, and some work was done by Mr. C. A. DeWolf, at the Lennox Passage quarries.

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## ANTIMONY.

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The operations at the Rawdon Antimony Mine have been steadily continued during the year. A large and well timbered shaft has been sunk near the road, clear of the vein; and through it all future operations of pumping and winding will be carried on. The returns show that discoveries of Antimony ore are reported from Kentville, and from the Melrose district, Guysboro' County.



## COPPER.

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During the past season Mr. M. F. Egar did some work on a promising deposit of copper pyrites near Pinkietown, Antigonish County. Dr. Johnstone and Mr. J. McNeil proved some rich ore in the same locality.

At Coxheath, near Sydney, in Cape Breton County, the Coxheath Copper Company have had a line of railway six miles in length surveyed from the mine to Lime Point, on Sydney Harbor. Land has been secured and arrangements made for erecting a large establishment for treating their own and foreign ores, for conversion into matte. It is stated that contracts extending over terms of years, have been made, which guarantee abundance of ore in addition to the large amounts which recent exploratory work has shown in their own mine. Towards the close of the year more powerful pumping and winding gear were erected, and the compressed air drill plant enlarged to the dimensions originally contemplated, and the sinking of the shaft and extension of the preliminary levels vigorously pushed. It is confidently believed by the Directory of the Company that the essentials for the successful prosecution of a large copper reducing business exist at this point. Certainly the conditions of cheap fuel, limestone, iron ore, water carriage, etc., etc., cannot be surpassed. Trial runs made under the superintendence of Dr. Peters, the well known copper expert, with Coxheath ore, Reserve coke, and local fluxes of Sydney limestone and iron ore, gave the greatest satisfaction, yielding copper matte of excellent quality, with an insignificant loss of metal. The establishment of this undertaking would open a market for the many deposits of rich copper ores known in Antigonish, Pictou, Colchester and Cumberland Counties, which have not yet been worked.

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## MANGANESE.

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Mr. J. W. Stephens continued working at Tenny Cape and Walton. The Messrs. Churchill are reported to have found good ore at Hantsport. Messrs. Thompson and Foster tested a bed of manganese ore near Kentville, which is stated to be suitable for making ferromanganese. On the Salmon River, near the Valley Station, work was continued by Messrs. Carter, Archibald and others, and about 60 tons of ore mined. The ore occurs as a gravel lying on sandstones in the vicinity of carboniferous limestones, and as irregular veins cutting the measures. The Hon. E. T. Moseley continued working at the Morrison mine at Salmon River, Cape Breton.

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## DEPUTY INSPECTORS' REPORTS.

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### DISTRICT OF PICTOU, COLCHESTER AND CUMBERLAND.

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WESTVILLE, PICTOU Co., N. S.,

*December 31st, 1885.*

E. GILPIN, Esq.,

*Inspector of Mines:*

DEAR SIR,—I have much pleasure in forwarding you a condensed statement for the past year of my work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland.

#### VALE COLLIERY.

I was at this mine very frequently during the year, in all 22 times. On February 10th, a serious explosion took place in the McBean Seam, by which thirteen men lost their lives and five were seriously injured. I was in Cumberland County at the time, and arrived at scene of disaster on the 12th, and remained for some length of time investigating the cause of the accident.

On April 6th I went down the McBean Seam to the point where the men had been working at the time of the explosion, and examined a hole at that point which was supposed to have been fired on the night of the explosion, and which some of the officials consider caused the explosion. The cause of the explosion at the Vale Colliery is a matter of dispute amongst experts, but the most reasonable solution appears to be as follows:—On the west side of the slope at 1300 feet level were two check doors, which, when shut, sent the air circulating down the slope, but if opened the air would rush to the upcast, as an exhaust fan is situated on that side, and thus the lower part of mine would be cut off from the air communication, which, if allowed for any length of time, would undoubtedly accumulate gas; from appearances, I would judge this to have transpired, and gas to have been generated in the manner supposed. Gas then having been driven down by the restored action of the air, was forced upon Foley's lamp, who was working in a head about 100 feet from sinking-face. He was burned almost to a crisp, whilst two-thirds of the men below him had scarcely a singed hair. Whilst sinking they drive leads east and west from back slopes, at intervals of about 60 feet, at right angles to slopes, which are cut again at the face coming up the hill with shoots. Heads driven up the hill off the air current, any distance, and left standing, will fill with gas; this has been an occurrence before the explosion and since, which would lead me to believe that the air current must

have in some way been tampered with, and the restored action resulted as I have stated. In support of this view, I would say that the timbers in the slopes from the head in which Foley worked "downward," that is toward the sinking face, gave unmistakable evidence that the explosion came from above, whilst the timber above this head gave like evidence that the explosion came from below, until it reached the 1800 feet level, which is some 400 feet above the head, then it expanded east and west, destroying the check-doors on the levels, and showing slight signs of the explosion for a distance of 200 or 300 feet in the levels inside the doors, which were from 70 to 100 feet off the slope. The stoppings between the main slope and back slopes from this level up to 1300 feet level were blown down. Strange to say, the first check door at 1300 feet level on west side was found standing open, whilst the inside door was destroyed. At this point there were men employed taking timber from the slope to some point inside of the doors. The explosion had gone in this level a distance of not more than 200 or 300 feet. The stoppings from 1300 feet level to mouth of slope were blown down and timber and debris were strewn in a confused way all through the slope.

The force of the explosion seems to have been spread over the area I have mentioned, viz., on the main slope and back slopes, and extending east and west from main slope a distance of from 200 to 300 feet, over which area the timber was in many cases blown down, and falls of roof took place, while the working faces on the east and west side of pit were free from any appearance of explosion, and in as good order after as before.

After the mine resumed work and the water was extracted, a hole was discovered at the working face of the sinking. The evidence brought to show that this hole was fired before the explosion, did not appear conclusive.

On November 26th, I experimented with dynamite in this mine, and believe that under favorable circumstances it might be used with advantage for some coal mining purposes.

#### HALIFAX COAL COMPANY.

*Slopes Nos. 1 & 2.*—During the year I visited those slopes 12 times. On my inspections I found that the management kept the mine in good order, and in compliance with the law. Gas during the entire year was to some extent given off in No. 2 slope.

*McGregor Pit.*—This mine was idle from and including June 3rd. I made several official visits, on which occasions, after travelling the working faces and airways, I found they were in satisfactory condition. In December I travelled the workings to the rise and found the airways, etc., in excellent condition.

#### ACADIA COAL COMPANY.

*Acadia Colliery.*—I made official visits to this mine 12 times during the year. Work was carried on to every appearance in a satisfactory and systematic manner. They have sunk the new lift a

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distance of some 600 feet, making the total depth of this slope on the angle 3100 feet, or a vertical depth of 1307 feet. A pump of the Knowles pattern has been added to this mining plant, which is capable of performing all the duty required.

#### INTERCOLONIAL COAL COMPANY.

*Nos. 1 & 2 Slopes* were visited by me twelve times. During the summer a weight came on the pillars of the 1700 feet level which caused a creep, and in September, on my visit, I learned that the pillars, which were being extracted from three lifts, viz., on the 1000 feet, 1300 feet, and 1700 feet leads, were successfully extracted from the two first named, but owing to the creep on 1700 feet level, as large a percentage of coal could not be got from it as the others. In August the management ceased pumping at the Scott pit, which is sunk to the second seam. During the year gas was reported in pillar workings, upon which the use of powder was discontinued. I have found the air, as regards quantity, all that could be wished for, and the air passages kept clear.

Alexander Grant and John Muir have done a considerable amount of work on a seam of coal at Coal Brook, a short distance east of New Glasgow. They have erected a small winding engine and force pump. The coal in slope presents a troubled appearance, but in the bords driven eastwardly it is of a more regular form.

#### CUMBERLAND COUNTY, SPRING HILL MINES.

I visited these mines ten times during the year. On my visit in March there was some gas reported on the west side of west slope, the law was complied with and shot-firers appointed. In November the airways of west slope, which had become partially unsafe, were being retimbered, and in December I ascertained it was all in good condition. The South slope at this date was down a distance of 830 feet and sinking operations still continued. The coal has as good an appearance at this point as it had at the start. There is another seam of coal 11 feet thick, which presents a good appearance, underlying this seam. A small shaft is sunk on it, and considerable prospecting has been done with good results.

#### CHIGNECTO.

I visited this mine ten times during the year. This mine is in good order, and the air all that could be desired, but for some cause the mine has not been in very active operation during the year. But it is in order to make a large output of coal whenever it is requisite so to do.

#### JOGGINS.

I visited this mine ten times during the year, namely:—January 12, February 11, April 13, May 18, June 23, July 18, August 11, October 13, November 17, December . This mine has been idle for a good part of the year. I travelled working faces and airways, and found all in good order.

**MILNER MINE.**

John Hurley left this mine about the middle of the year, and Alexander Dewar had charge until about October. From 3 to 8 men were employed in it for the most part of the year. I have made ten official visitations to the works and found volume of air, etc., satisfactory. Since October Mr. Ripley has taken charge of this mine.

**MINUDIE.**

I paid ten visits to this mine during the past year. This mine has been doing a little for the most part of the year. The air is good. They still continue the long-wall system with fair results.

**SCOTIA.**

I visited this mine ten times during the year. On June 24th, at date of a visit, I found that fire had started on west side of new slope; in July it was to appearances extinguished, but I am strongly of opinion that it is there still. In August they had shut down the old slope and started to open up a new slope, and they completed this work in September, and since that date they have been taking out coal

S. E. Freeman in August commenced operations on the old Lawson mine, and has driven down the old slope sixty feet, and has since had a few men to work getting out coal.

**SALTSPRINGS MINING CO.**

This mine was also regularly visited by me. In January they had everything in preparation for sinking, and in March were down 137 feet, in April levels were driven off 140 feet. During my subsequent visits the mine was idle, and unfortunately the engine house was burned down in September, and from that time operations ceased.

**WILLIAM PATRICK & CO.**

In this mine in the summer Mr. Patrick started 2 or 3 men to work, and had been gradually increasing the number as the mine was opened up, until they had 9 or 10 men to work at the end of the year. The water is extracted from the works by means of a syphon. The seam is about 2 feet thick and of excellent quality.

The foregoing is a condensed statement of my work on the past year. I have likewise appended tables shewing the volume of air in each mine, the number of accidents, etc., etc.

*Accidents during the year 1885, in the Pictou, Cumberland and Colchester Mines.*

No.	Date.	Name of Mine.	Person.	Occupation.	Remarks.
1	Feby. 10	Vale Colliery	John Campbell	Overman .	Killed by explosion.
2	"	" "	Neil McKinnon	Driver....	
3	"	" "	P. McBeth....	Stableman	
4	"	" "	H. Cameron ..	Pumpman.	
5	"	" "	D. Kennedy ..	Loader....	
6	"	" "	J. McLean....	Bottomer .	
7	"	" "	J. McEachern	do.	
8	"	" "	P. Foley.....	Miner ....	
9	"	" "	T. Ryan.....	Bottomer .	
10	"	" "	J. W. Fraser..	Miner ....	
11	"	" "	J. Grant.....	do. ....	
12	"	" "	D. McNeil....	do. ....	
13	"	" "	Joe Haggart..	do. ....	
14	"	" "	A. McDonald..	.....	Injured by explosion.
15	"	" "	J. Robertson ..	.....	
16	"	" "	J. Guthro ..	.....	
17	"	" "	H. Lamont....	.....	
18	"	" "	R. Love .....	.....	Hands burned with gas.
19	" 29	Acadia .....	Charles Reid....	Miner ....	
20	April	Saltsprings..	Mike Murphy ..	do. ....	Collar bone broken.
21	" 28	Acadia .....	— McDonald..	Driver....	Jammed with boxes.
22	May 16	Drummond .	Nor'an McKenzie	Cageman .	Jammed between prop and cage.
23	" 27	"	— Leadbeater	Driver....	Leg broke.
24	" 27	Spring Hill.	Angus McLeod..	Miner ....	Foot smashed.
25	Aug. 28	"	Don'ld McDonald	do. ....	{ Legs broken; died in a few days after accident.
26	" 28	Spring Hill.	John Scully ....	do. ....	Killed; run over by cage.
27	Sept. 24	Vale .....	John Guthro....	do. ....	Burned with gas.
28	" 24	" .....	Charles Guthro..	do. ....	" "
29	" 25	" .....	John O. Hanley.	do. ....	" "
30	Oct. 8	Albion .....	James Ferguson.	Trapper...	{ Leg broke; empty rake on slope run over him.
31	Nov ....	Patrick Mine	John McGilvray.	Miner....	Leg broke riding on boxes.
32	Dec....	Spring Hill.	— Wilson ....	do. ....	{ Seriously burned by an explosion of powder.
33	Dec....	" "	— Hoslem ....	do. ....	
34	Nov ....	" "	George Wallace..	do. ....	{ Arm broke by a piece of coal from the working face.

*Table shewing the Quantities of Air in cubic feet per minute, as measured by me in the Cumberland and Pictou Collieries, during the year 1885.*

COMPANY.	MINE.	Jan.	March.	April.	May.	June.	July.	Aug.	Nov.	Dec.
Halifax Coal Co., Stellarton..	McGregor Pit .....	59,691	67,449	72,708	76,298	76,790	Idle.	Idle.	Idle.	Idle.
	Slope No. 1 .....	19,000	34,600	27,750	24,750	27,600	21,000	24,000	21,750	26,850
	Slope No. 2 .....	21,000	27,720	28,000	25,920	23,040	21,600	22,320	18,000	24,480
	Slope .....	67,000	90,000	96,900	98,000	95,000		91,000	97,900	95,000
Intercolonial Coal Co., Westville..	Slope .....	60,000	71,000	63,500	54,120	65,000		62,000	64,700	64,850
Acadia Coal Co., Stellarton..	McBean Seam .....	Idle.	64,000	66,000	72,000	71,125		34,580	70,000	67,700
Vale Coal Company .....	Six Feet Seam .....	17,550	17,700	15,000	11,330	12,090		19,000	32,200	32,000
	West Slope .....	35,200	31,500	34,800	15,600	15,000		17,000	24,800	29,000
	East Slope .....	Idle.	22,000	14,700	33,000	32,000		31,000	32,520	31,600
	North Slope .....	14,500	35,000	30,000	31,650	27,300		25,600	50,800	51,200
Chiegnecto .....	Slope—Chiegnecto..	Idle.	17,000	15,120	17,100	17,600		13,000	13,800	17,200
Minudie .....	Minudie .....	Idle.	Idle.	4,800	5,000	5,400		3,600	5,750	6,200
Joggins .....	Slope .....	3,200	Idle.	18,240	19,700	21,200		13,960	13,300	Idle.
Boston Mining Company .....	Slope .....	4,300	Idle.	4,000	4,500	5,000		7,000	4,000	4,700
Scotia .....	Slope .....	Idle.	4,330	3,700	Idle.	.....		5,000	6,500	7,100
Lawson .....	Slope .....	Idle.	Idle.	Idle.	Idle.	Idle.		Idle.	2,000	3,000
Salt Springs .....	Slope .....	Idle.	3,700	4,800	Idle.	5,120		Idle.	Idle.	Idle.
New Glasgow Coal Company .....	Slope .....	.....	.....	1,800	1,875	1,940		2,000	5,600	6,000
Patrick Mine .....	Slope .....	.....	.....	Idle.	Idle.	.....		.....	2,600	2,700

I remain, yours truly,

W. MADDEN, JR.,

Deputy Inspector of Mines.



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**CAPE BRETON.**

BRIDGEPORT, *January 13th, 1886.*

E. GILPIN, ESQ.,

*Inspector of Mines :*

DEAR SIR,—I beg leave to hand you the following report as Deputy Inspector of Mines, of my work in the Island of Cape Breton for the year ending December 31st, 1885 :

**SYDNEY MINES.**

I visited this mine fourteen times during the past year. On January 20th fire was discovered in some of the old workings on the north side of the pit towards the dip. It was thought at first that it could be extinguished in two or three days, but it spread rapidly through the workings in spite of every effort made to put it out. It was then deemed necessary to flood that district. About the 16th of March work was resumed, as is usual, on the south side of the pit, and also on the north side towards the rise. A number of men were engaged splitting and taking coal from the pillars. In the meantime the water in the burnt district was lowered considerably, so as to admit of the miners going to work again in the boards on the north side.

**VICTORIA MINES.**

This mine has worked very steady the past year, the levels have been extended, and counter levels driven parallel to them for the purpose of ventilation and drainage. A new landing has been made at the bottom of the east slope, which gives more room. The ventilation in this mine is much improved, the fan is capable of giving a much greater quantity than shown on the table, if required.

**BARASOIS.**

At this mine a new parallel slope is being driven on the west side of the one driven last year. As they are extended towards the dip, the coal seems to improve in quality very much. There has been a large engine brought to this mine for the purpose of pumping and hoisting coal, etc. It is now in course of erection.

**LINGAN MINES.**

In this mine I cannot notice any considerable change. The work was carried on in the usual way, except a new return air course through a portion of the lower workings. The water discharged from the colliery is pumped by three home manufactured pumps in three lifts, one delivering to the other. No. 1 discharging to a level that leads to the sea shore.



## OLD BRIDGEPORT.

At this mine a new hoisting engine of 50 horse power has been put up; also bank and pulley frames, screens, cages, and slides. In the pit the headways have been extended 468 feet towards the rise. The manager says that it is his intention this winter to drive one of these to the surface for a travelling road, and the other to a shaft to be sunk for a furnace. If this is done this colliery can be easily ventilated next season. There is no water pumped from this mine, as it runs to the sea shore through a water level. The workings are not yet driven below tide level.

## INTERNATIONAL MINE.

At this mine the work under ground has been carried on as usual. The column pipes were replaced by new ones wherever required, and about 800 feet of piping was inserted. There is not as much water pumped from this mine as from most of the others, owing to a water level driven from the sea shore, which drains off the surface water between that and the crop of the coal. Also, there is no broken surface to the dip of this level.

## RESERVE MINE.

At this mine the levels at the south side of the French slope have been extended, and an air shaft sunk on one of them; also, slants have been driven towards the dip. From North slants at six chains levels were broken off, and driven about two chains. From the south slants at ten chains bords have been broken off, but no levels driven yet. The drift has been driven from the Reserve to the Emery seam, and it is intended to sink an air shaft this winter on it.

## CALEDONIA MINE.

At this mine a pair of slants have been driven on the west side of the shaft 500 feet to the dip. At 300 feet levels have been turned off right and left, and driven, and bords broken off, making two working sections in that district. The manager says that it is his intention to have those slants further driven this winter, to gain another lift. The pumps at this colliery are in two lifts or sets in the shaft, one pumping to the other.

## LITTLE GLACE BAY MINES.

In the underground workings at this mine there has been no change made last year. The coal raised from the mine has been taken from bords already broken off. On the surface there has been a fine smokestack and six boiler seats built, and one new and two old boilers placed in. In a few days the other will be put in.

## ONTARIO MINE.

At this mine the upper level has been timbered and cleared out to the face, and also a road laid in. The bords on the high side of this level have also been timbered, and crosscuts opened towards the furnace

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for ventilation. The coal mined for the past season was taken out of this section.

BLOCK HOUSE MINE.

At this mine work has been rather dull. The coal mined for the past season was partly taken from pillars to the dip.

GOWRIE MINE.

In this mine there has been a pair of slants driven at the east side of the pit bottom fifteen chains and fifty links. Also the hanging roof along the main road has been down to make more room, and for the purpose of greater safety. A new engine, manufactured by the Ledgewood Manufacturing Company of New York, is being placed on the surface to haul the coal from the deeps. The pumps that are in the shaft are in two lifts; they are the ordinary perpendicular lifting pumps, the same as at Caledonia, Little Glace Bay, and Sydney Mines.

I beg to enclose you in tabular form number of cubic feet of air measured by me on my visits, number of tons of water discharged, number of tons of coal raised, etc. Also, table of accidents and their causes during 1885.

In conclusion, I would like to draw your attention to one particular thing, that is, the careless manner in which miners load horizontal holes bored in rock. It often happens that the holes are three-cornered, and during loading some of the powder remains in the lower groove, and is very often ignited by the stemmer. Such was the case with John Peck at Sydney Mines last year, and two others injured at the International in 1884.

*Report of Accidents in Cape Breton Mines during 1885.*

Date of Accident.	Name of Mines.	Name.	Occupation.	Remarks.
April 18 . . . .	Reserve . . . . .	Michael McMullin . . . . .	Miner . . . . .	Fall of coal from face.
May 28 . . . .	Sydney Mines . .	John Peck . . . . .	Miner . . . . .	Explosion of gunpowder, blasting rock.
June 25 . . . .	Sydney Mines . .	Thomas Mahar . . . . .	Labourer . . . .	Run over by full trip on engine plane.
" . . . .	Sydney Mines . .	Neil McInnis . . . . .	Labourer . . . .	" " "
August 5 . . . .	Little Glace Bay	Hugh Campbell . . . . .	Miner . . . . .	Collar bone broken by fall of coal from face.
September 3 . .	International . . . .	Duncan Curry . . . . .	Miner . . . . .	Leg fractured by fall of coal from face.

Report of No. of cubic feet of Air passing through Mines in Cape Breton for 1885.

NAME OF MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines .....	10,000	10,000	25,230	31,325	36,000	40,000	.....	34,000	47,260	46,350	55,000	43,986
Victoria .....	19,320	19,000	18,000	19,200	15,580	20,000	28,850	28,000	31,370	.....	36,540	40,000
Barrasois .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Lingan .....	12,000	21,000	21,500	25,000	20,000	19,600	.....	18,000	21,500	.....	20,270	21,000
Bridgeport .....	.....	.....	3,000	3,400	.....	4,150	1,600	1,500	3,000	.....	5,000	5,000
International .....	.....	.....	.....	28,800	31,000	27,500	.....	28,500	26,000	.....	28,830	20,000
Reserve.....	20,000	.....	.....	16,300	26,000	27,400	30,000	22,000	24,300	.....	31,394	28,000
Caledonia .....	1,500	.....	4,612	27,300	28,000	32,200	34,640	36,000	37,734	30,523	29,000	7,500
Little Glace Bay.....	.....	.....	13,000	6,000	6,500	7,000	.....	9,230	14,000	9,000	9,750	10,000
Ontario.....	.....	.....	3,500	5,000	3,000	2,500	4,000	4,000	8,700	6,600	.....	5,500
Block House.....	.....	.....	.....	17,500	18,000	.....	.....	10,000	.....	.....	.....	18,000
Gowrie .....	.....	15,000	.....	22,500	20,000	19,500	16,500	20,000	24,130	20,000	25,300	.....

I remain, yours truly,

PATRICK NEVILLE,

Deputy Inspector of Mines.

*Average weight of Water pumped during year ending Dec. 31st, 1885, compared with the weight of Coal raised during the same period.*

NOVA SCOTIA.

MINES REPORT.

Intercolonial Coal Company.	No. 1 and 2 slopes.	1 No. 2 Cameron Pump.	35,000	63,875	109,139
		1 Nos. 3 and 4 Cameron Pump.			
		1 No. 3 do.			
		1 Knowles Independent Condenser			
Acadia Coal Company.	One Slope	Knowles Pump	86,400	157,680	98,150
	McBean seam, one slope.	1 Knowles Steam Pump	25,200	45,990	
		1 Cameron Pump			
Vale Coal Company	Six feet seam, one slope.	1 do.	10,800	19,710	76,125
		1 Blake do.			
		Water hoisted with Boxes	15,600	28,470	
Halifax Coal Company	Douglas seam, slopes 1 and 2	No. 8 Cameron Pump	19,104	34,864	129,195
	McGregor seam, shaft.	Hoisted with Iron Tanks	1,056,000	(Ran only a portion of year.)	
	Foord Pit.	2 Blake Pumps			
	East Slope.	2 Cameron do.	307,627	561,419	335,055
Cumberland Railway & Coal Co., Spring Hill Mines.	West Slope.	2 Allison do.			
Montreal and New Glasgow Joggins Mines	One Slope.	1 Burrel-Johnston Pump	23,142	42,234	20,210
					17,664
Milner Chignecto.	Slope	Cameron Pump.			200
	Slope	Water level of this mine worked along out-crop of seam	14,400	26,280	6,084
Boston Mining Co.			Unknown		
		Same as preceding	Unknown		
Scotia	Slope	No. 4 Cameron Pump.	17,666	32,240	1,318
Minudie	Slope	Hoisted by Boxes	7,200	3,312*	7,702
Lawson Mine, per S. E. Freeman	Slope	Syphon	9,600	17,520	115
W. Patrick & Co	Slope				485

\* This is for October, November, December, 1885.

CAPE BRETON.

COLLIERIES.	No. of Pumps.	Name and style of Pump.	Average gallons discharged per day.	Tons of Water raised during 1885.	Tons of Coal raised during 1885.
Sydney Mines.....	2	Double Acting.....	172,620	261,278	125,033
	2	Lifting Pump.....	139,863	227,901	
Victoria .....	2	Double Acting.....	142,380	232,003	47,614
Lingan.....	3	Built to order .....	80,124	131,056	21,761
International .....	2	Cameron .....	7,275	117,885	67,959
	2	Cameron, No. 6 .....	115,984	334,000	83,276
Reserve .....		" 5 .....	124,500		
	2	Lifting Pumps .....	86,400	170,785	58,859
Caledonia .....	1	No. 6 Cameron .....	205,384	334,678	39,400
Little Glace Bay.....	2	Lifting Pumps.....	648,720		
	3	Knowles .....	139,984	268,457	11,075
		Built to order.....	139,984		
Block House .....		" .....	328,264	535,252	74,414
	1	Knowles' Special .....			130
Gowrie .....	2	Built to order .....			13,178
Barasois .....		Sinking.....			7,779
Old Bridgeport .....		} Natural drainage .....			
Ontario .....					
		Totals.....		3,646,889	1,352,205

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al.....	Tatamagouche .....	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others.....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River .....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James .....	East River.....	1
43	Hudson, James .....	" .....	1

Total area under lease.....19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.....	N. Side East Bay .....	1
91	Brookman, S. L.....	East Bay .....	1
93	Brookman, S., et al.....	" " .....	1
102	C. L. Ingraham.....	" " .....	1
103	A. McKenzie, et al.....	" " .....	1
92	Matheson, D., et al.....	" " .....	1
84	Protheroe, Pryse.....	Cow Bay .....	1
16	Inverness C. I. & R. Co.....	Whycocomagh .....	1
Total area under lease.....			27½ square miles.



LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al.....	Tatamagouche .....	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others.....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River .....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James .....	East River.....	1
43	Hudson, James .....	" .....	1

Total area under lease.....19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.....	N. Side East Bay .....	1
91	Brookman, S. L.....	East Bay .....	1
93	Brookman, S., et al.....	" .....	1
102	C. L. Ingham.....	" .....	1
103	A. McKenzie, et al.....	" .....	1
92	Matheson, D., et al.....	" .....	1
84	Protheroe, Pryse.....	Cow Bay .....	1
16	Inverness C. I. & R. Co.....	Whycocomagh .....	1
Total area under lease.....			27½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al.....	Tatamagouche .....	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others.....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River .....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James .....	East River.....	1
43	Hudson, James .....	" .....	1

Total area under lease.....19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.....	N. Side East Bay .....	1
91	Brookman, S. L.....	East Bay .....	1
93	Brookman, S., et al.....	" " .....	1
102	C. L. Ingraham.....	" " .....	1
103	A. McKenzie, et al.....	" " .....	1
92	Matheson, D., et al.....	" " .....	1
84	Protheroe, Pryse.....	Cow Bay .....	1
16	Inverness C. I. & R. Co.....	Whycocomagh .....	1
Total area under lease.....			27½ square miles.



16	Seaman, Gilbert .....	.....	1	Working.	M. Dunlop....	River Herbert
24	Shannon, S. L.....	.....	2			
36, 39	Shannon, S.L. (intrust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.)...	.....	5		J. S. Hickman..	Amherst.
9	Victoria Coal Mining Co...	.....	2			
26, 27	Wright, John V.....	.....	3			
			65			
		PICTOU CO.				
1	Acadia Coal Co.....	Fraser.....	1	Working.	{ H. S. Poole..	Stellarton.
3	" .....	Acadia .....	1	"	{ J. Maxwell..	Westville.
42	" .....	Pictou.....	4		{ J. B. Moore..	New Glasgow.
23	Allan, Sir Hugh, K't.....	Vale .....	3	Working.	{ T. Turnbull..	Vale Colliery.
10	Gray, B. G., et al.....	.....	1			
11	Halliburton, R. G., et al..	.....	1			
	Halifax Co., (Ltd.) .....	Albion ...	4	Working.	{ S. Cunard & Co	Halifax.
13, 14	Intercolonial Coal Co.....	.....	2		{ J. Rutherford	Stellarton.
12	" .....	Drummond .....	1	Working.	Robert Simpson	Westville.
6	Kirby, Lewis R.....	.....	1			
15, 30, 31	Merigomish Co.....	.....	3			
25	Nova Scotia Co.....	Black Diamond..	4		M. H. Angell..	Westville.
24	Richey, M. H.....	.....	1			
			27			

## LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		CAPE BRETON CO.				
3	Archibald, Blowers .....	Gowrie .....	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney Cow Bay.
2	Archibald, Thomas D.....	" .....	1			
5, 28	Blockhouse Mining Co.....	Blockhouse.....	2	Working.	R. Belloni .....	Cow Bay.
29	" (sea area).....	.....	1			
72	Brookman, Samuel .....	.....	1			
76, 77	" S., et al.....	.....	2			
15	Caledonia, C. & R. Co....	Caledonia .....	1	Working.	David McKeen...	Glace Bay.
31	" (sea area).....	.....	1			
30	Campbell, Alex.....	.....	1		T. D. Archibald...	North Sydney
8, 9	Halifax Coal & Iron Co..	Ontario .....	1½	Working.	Jno. Sutherland...	Pt. Caledonia.
87	Cossit, Geo. G.....	.....	1			
	General Mining Association	.....	2		{ Rich. H. Brown. Cunard & Morrow	Sydney Mines Halifax.
27	" " " (sea area)...	Bridgeport.....	18	Working.	{ H. Mitchell.... Donald Lynk....	Bridgeport. Low Point.
	Low Point, Barasois, and...	Sydney .....	4			
38, 39	Lingan Mining Co., (Ltd.)	Lingan .....	13	Working.		
10, 21	Gibson, John, et al.....	" .....	10			
		.....	2			
4, 12, 16	Glace Bay Mining Co....	Glace Bay .....	3	Working.	{ E. P. Archbold. Chas. Rigby....	Halifax. Lt. Glace Bay.
75	Henry, W. A.....	.....	1			
22	Ingraham, J. L.....	Halfway.....	1			

	International Coal Co., Ltd.	International.....	Working.	P. Johnstone.....	Bridgeport.
6, 13, 18, 19	Jennings, Edward.....	.....	4		
71	LeCras & McInnes.....	.....	1		
47	Merchants' Bank of Canada.	Gardener .....	1		
66	Moore & Moseley.....	.....	2		
74	McDonald, W. B.....	.....	1½		
101	McLeod, Hugh .....	.....	1		
52, 53	Paint, Henry N., and others	.....	2		
88, 89, 90	Protheroe, Pryse .....	.....	3		
83, 85	Reid, Thos. S. ( <i>sea area</i> )..	.....	2		
73, 82	Ross, H. E., et al.....	.....	2		
40, 41, 42	Ross, W. J., et al ( <i>sea area</i> )	.....	3		
79	South Head Coal Co.....	South Head .....	1		
43	Sword, Wm. ( <i>sea area</i> )..	.....	1		
32	Sydney & Louisburg Coal &	.....	3		
23, 25, 70	R. R. Co., Ltd.....	Schooner Pond..			
14, 24	" " " "	Reserve .....	10	{	F. C. Kimber... Sydney. W. Routledge.. Reserve Mines
49	" " " "	Lorway .....			
64, 65, 68	" " " "	Emery .....			
69	Sydney C. M. Co. ( <i>sea areas</i> )	.....			
54 to 63	Toronto Coal Co.....	Collins .....	10		
46	Weatherbe & Kirby .....	.....	1		
67	Weatherbe, R. L. ( <i>sea area</i> )	.....	1		
78	Low Point, Barasois and	.....	5		
96, 97, 98, 99, 100	Lingan Mining Co., Ltd..	.....	5		
	" ( <i>sea areas</i> )	.....	2	Working. D. Lynk.....	Low Point.
			128½		





TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter .....	57,102	49,787	92,726	69,168	29,979	6,396	.....	.....	179,807	125,351
2nd Quarter .....	98,512	91,238	110,780	97,575	162,705	120,700	.....	.....	371,997	309,513
3rd Quarter .....	101,220	95,605	130,860	137,132	237,100	278,050	.....	.....	469,180	510,787
4th Quarter .....	112,089	103,905	98,453	92,125	118,694	112,829	.....	.....	329,236	308,859
Total .....	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884 .....	279,946	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883 .....	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882 .....	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			Grand Total.
	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	
Nova Scotia																
Land Sales .....	24,431	37,704	19,507	98,093	65,658	2131	2305	5892	87	....	....	....	124,829	109,254	21,725	255,808
Sea borne .....	1571	740	.....	33,380	10,066	....	129,914	12,919	254	....	....	....	164,865	23,725	254	188,844
Nova Scotia, total..	26,002	38,444	19,507	131,473	75,724	2131	132,219	18,811	341	....	....	....	289,694	132,979	21,979	444,652
New Brunswick ....	37,616	22,362	32,892	25,573	1693	....	28,163	335	.....	....	....	....	91,352	24,390	32,892	148,634
Newfoundland .....	.....	.....	.....	4468	21	....	69,123	710	.....	....	....	....	73,591	731	.....	74,322
P. E. Island .....	.....	.....	.....	13,316	25,841	....	10,988	2625	.....	....	....	....	24,304	28,466	.....	52,770
Quebec .....	17,360	20,095	125,845	114,697	666	....	151,166	16,348	47,740	....	....	....	283,223	37,109	173,585	493,917
West Indies .....	.....	.....	.....	99	15	....	5618	.....	.....	....	....	....	5717	15	.....	5732
United States .....	412	.....	.....	283	.....	....	9802	23,986	.....	....	....	....	10,497	23,986	.....	34,483
Other Countries .....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....	....	.....	.....	.....	.....
Total .....	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	....	....	....	778,378	247,676	228,456	1,254,510
1884 .....	155,999	102,406	.....	330,309	133,872	....	459,210	79,845	.....	....	....	....	945,518	316,132	.....	1,261,650
1883 .....	152,453	69,894	.....	319,859	141,950	....	543,419	69,195	.....	687	66	....	1,016,418	281,105	.....	1,297,523
1882 .....	151,281	67,068	.....	329,350	116,787	....	522,325	63,245	.....	125	....	....	1,003,079	247,100	.....	1,250,179

## COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter	4th Quarter.	Year 1885.	Year 1884.
N. Scotia.						
Land Sales.	69,824	61,461	54,578	69,945	255,808	266,475
Sea borne..	6,720	43,706	91,998	46,420	188,844	226,575
N. Scotia—T'l	76,544	105,167	146,576	116,365	444,652	493,050
N. Brunswick	17,574	35,911	45,182	49,967	148,634	158,420
Newfoundl'd..	84	12,253	36,337	25,648	74,322	86,216
P. E. Island..	.....	13,747	28,118	10,905	52,770	50,399
Quebec .....	30,738	135,446	233,764	93,969	493,917	396,782
West Indies..	245	675	774	4,038	5,732	9,595
United States	166	6,314	20,036	7,967	34,483	64,515
Other Conntries....	.....	.....	.....	.....	.....	2,673
Total....	125,351	309,513	510,787	308,859	1,254,510	1,261,650
1884..	138,303	307,915	486,601	328,821	1,261,650	1,297,523
1883..	141,994	325,153	498,913	331,463	1,297,523	1,250,179

## COAL.—GENERAL STATEMENT.

1885.	Produce.	Sales.	Colliery Consumption.
1st Quarter .....	179,807	125,351	30,862
2nd Quarter .....	371,997	309,513	28,477
3rd Quarter .....	469,180	510,787	31,912
4th Quarter .....	331,221	308,859	36,373
Total.....	1,352,205	1,254,510	127,624
1884 .....	1,389,295	1,261,650	116,769
1883 .....	1,422,553	1,297,523	111,949
1882 .....	1,365,811	1,250,179	111,381

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MINES REPORT.

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1885.

COLLIERIES.	SEAMS.	PRODUCER.	SALES.				COLLIERY CONSUMPTION.			
			Round.	Slack.	Run of Mine.	Total.	Per cent.	Engines.	Unknown.	Per cent.
CUMBERLAND Co.	North .....	6,084	3,359	1,409	.....	4,768	78	1,262	179	23
	Joggins .....	17,664	11,473	3,157	.....	14,630	82	2,492	327	15
	Milner .....	200	51	.....	.....	51	25	.....	.....	.....
	Minudie .....	7,702	6,493	627	.....	7,120	92	500	172	8
	Patrick .....	485	383	102	.....	485	.....	.....	.....	.....
	North, Main and South.	335,055	58,171	75,375	178,244	311,790	93	16,057	3,360	5
	Salt Springs .....	400	75	153	.....	228	70	160	4	40
	Scotia .....	1,318	1,270	78	.....	1,348	100	.....	.....	.....
	Lawson .....	115	115	.....	.....	115	100	.....	.....	.....
	PICTOU Co.	Acadia .....	98,150	58,791	31,637	.....	90,428	92	5,237	2,083
Third and McGregor..		129,195	74,395	37,535	2,131	114,061	88	11,847	4,196	12
Acadia .....		109,139	75,435	22,442	.....	97,887	89	6,412	2,690	8
New Glasgow*		200	.....	.....	.....	.....	.....	.....	.....	.....
Vale .....		96,135	76,288	12,346	.....	93,634	92	12,464	1,542	14
CAPE BRETON Co.	Lingan .....	130	10	.....	.....	10	8	.....	.....	.....
	Phelan .....	13,178	11,953	630	.....	12,583	95	63	33	7
	Blockhouse .....	11,075	7,316	.....	.....	7,316	66	2,000	710	25
	Phelan .....	58,859	39,024	9,527	.....	48,551	82	1,123	1,136	3
	Sydney .....	759	136	623	.....	759	.....	.....	.....	.....
	Harbor .....	39,400	31,351	4,218	5,420	40,989	.....	2,927	1,295	10
	Gowrie .....	74,414	57,718	13,024	6,838	77,580	.....	2,040	2,130	5
	Harbor .....	(?)67,959	45,634	6,028	35,823	87,485	.....	1,915	1,338	4
	Lingan .....	21,761	17,233	1,634	.....	18,867	86	2,381	1,319	17
	Phelan .....	7,779	7,293	152	.....	7,445	95	92	236	4
	Harbor .....	83,276	59,644	12,903	.....	72,547	86	4,408	3,516	9
	Sydney .....	124,274	95,727	8,190	.....	103,917	83	13,639	6,694	16
	Victoria .....	47,614	34,040	5,886	.....	39,926	83	5,719	928	13
	.....	1,352,203	778,378	247,676	228,456	1,254,510	.....	93,736	33,888	.....

\* Further returns show 431 tons raised and 295 tons sold last quarter, 1885.

COLLIERY CONSTRUCTION ACCOUNT.—1885.

COLLIERIES	Shafts.	Slopes.	Adits.	Machinery.	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting	Total.
CUMBERLAND COUNTY.											
Chignecto .....	\$275 00				\$750 00						
Joggins .....											\$ 1025 00
Lawrence .....											
Milner .....		\$200 00	\$198 00				\$ 80 00	\$100 00			578 00
Minudie .....		411 00	42 00	\$ 481 00		\$83 00	634 00		\$85 00	\$574 00	2310 00
Saltsprings .....											
Wm. Patrick .....	40 00	660 00	150 00	120 00			275 00				1245 00
Springhill .....				9000 00	3334 00		4845 00	360 00		2454 00	19993 00
PICTOU COUNTY.											
Acadia .....				3263 00							3263 00
Albion .....											
Intercolonial .....				1670 00	715 00						2385 00
Vale .....				3000 00		3000 00					6000 00
New Glasgow .....		500 00	500 00	800 00	75 00		150 00				2025 00
CAPE BRETON.											
Barrasois .....		899 00		1143 00							2042 00
Bridgeport .....	90 00		275 00	754 00	230 00	800 00	770 00	156 00			3075 00
Blockhouse .....											
Caledonia .....		1035 00	1141 00	1116 00				405 00	644 00		4341 00
Glace Bay .....			52 00	1067 00							1119 00
Gowrie .....			1416 00	3600 00							5016 00
International .....					896 00						896 00
Lingan .....			532 00								532 00
Ontario .....			152 00	15 00							167 00
Reserve .....	45 00	6240 00	64 00	371 00	776 00	1457 00	922 00				9875 00
Sydney .....				608 00							608 00
Victoria .....		438 00	7800 00	87 00	298 00	4070 00	82 00				12775 00
Total .....	\$450 00	\$10383 00	\$12322 00	\$27095 00	\$7074 00	\$9410 00	\$7758 00	\$1021 00	\$729 00	\$3028 00	\$79270 00

## MINES REPORT.

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31, 1885.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.				TOTAL.		Average No. of tons, per Cutter.	Average tons per day, per Cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.
	LABORERS.		BOYS.		Skilled Laborers.	Boys.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Above.	Below.							
	Skilled Laborers.	Laborers.	Laborers.	Boys.										Days' Labor.				Days' Labor.		
CUMBERLAND Co.																				
Chignecto .....	7	2	2	2	1	5	1		2,243				18	5,097	869	3	23	1	260	
Joggins .....	34	7	7	7	8	23	7		7,976			108	98	15,687	518	4	104	2	128	
Minudie .....	18	7	3	3	5	5	2		2,907			260	42	8,643	427	1	32	1	234	
Salt Springs .....																				
Spring Hill .....	292	153	99	99	45	92	17	1	40,361			4,828	719	188,064	1,147	4	1,288	8	28	
Patrick .....	2	1			1	1	1		735			200	7	1,664			1	1	260	
Maccan .....	2											86	3	267	121			1	287	
Scotia .....	3				1	1	1		174				6	579	439	3	9	1	60	
Lawson .....	1	1	1	1	1		1		150				5	510	115			2	132	
Pictou Co.																				
Acadia .....	91	91	25	25	20	40	6		18,527				273	66,143	1,078	5	415	8	212	
Albion .....	200	110	59	59	66	101	34		54,335				570	131,196	645	2	520	17	248	
Intercolonial .....	126	50	61	61	31	56	9		26,057			574	336	80,126	866	4	532	7	205	
Vale .....	217	81	16	16	50	104	6		40,986				474	115,979	350	1	338	3	225	
New Glasgow .....	2	1	1	1	1				357			30	6	1,360						
CAPE BRETON Co.																				
Barasois .....		2	1	1		1			148			62	5	939						
Blackhouse .....	24	2	14	14	10	20	3		7,862				73	12,637	461	4	119	5	93	
Bridgeport .....	17	1	4	4	2	2	1		1,451			858	35	6,708	775	6	116	1	113	
Caledonia .....	70	5	18	18	12	20	10	4	9,623			3,358	155	28,542	840	5	392	6	150	
Francklyn .....	7	1	3	3	2	2	1		200				16	644				1		
Glace Bay .....	71	6	15	15	29	21	2		13,660				144	24,645	555	4	285	6	138	
Gowrie .....	108	12	37	37	18	38	14		15,478				227	40,424	688	6	670	8	111	
International .....	94	20	32	32	21	41	2		9,525				210	18,986	744	5	530	2	128	
Lingan .....	48	4	13	13	2	21	10		8,191				98	19,900	453	2	128	3	169	
Ontario .....	20	1	6	6	1	7	1		1,610				36	5,593	388	3	66	2	117	
Reserve .....	116	12	33	33	14	22	8		10,162			2,425	213	44,116	717	5	616	8	135	
Sydney .....	210	41	83	83	60	81	40		47,232				515	115,821	591	3	664	8	187	
Victoria .....	83	23	7	7	8	42	5		16,407				168	45,374	573	1	159	4	298	
INVERNESS Co.																				
Chimney Corner .....	2	1			1								4					1		
	1865	635	540	540	410	747	182	6	336,357			12,789	4,446	979,645	1,015	3	7,043	108	197	3,888

*Nova Scotia Coal Sales, from 1785 to 1885 (inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177
1786	2,000		1842	129,708	
1787	10,681		1843	106,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	51,048	1847	201,650	1,533,798
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320		1851	153,499	
1796	5,249		1852	189,076	
1797	6,039		1853	217,428	
1798	5,948		1854	234,312	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775	1857	294,198		
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		
1804	5,976	1860	322,593		
1805	10,130	1861	326,429		
1806	4,938	1862	395,637		
1807	5,119	1863	429,351		
1808	6,616	1864	576,935		
1809	8,919	1865	635,586		
1810	8,609	70,452	1866	558,520	4,927,339
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336		1871	596,418	
1816	8,619		1872	785,914	
1817	9,284		1873	881,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980	91,527	1876	634,207	7,377,428
1821	11,388		1877	697,065	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825			1881	1,035,014	
1826	12,600		1882	1,250,179	
1827	12,149		1883	1,297,523	
1828	20,967		1884	1,261,650	
1829	21,935		1885	1,254,510	
1830	27,269	140,820	Total...	6,098,876	
1831	37,170		23,545,447		
1832	50,396				
1833	64,743				
1834	50,813				
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198	839,981			

## SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	1871 to 1880.....	7,377,428



COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1868	228,132	\$1 25
1851	116,274	"	1869	257,485	"
1852	87,542	"	1870	168,180	"
1853	120,764	"	1871	165,431	"
1854	139,125	Free	1872	154,092	75
1855	103,222	"	1873	264,760	"
1856	126,152	"	1874	138,335	"
1857	123,335	"	1875	89,746	"
1858	186,743	"	1876	71,634	"
1859	122,720	"	1877	118,216	"
1860	149,289	"	1878	88,495	"
1861	204,457	"	1879	51,641	"
1862	192,612	"	1880	123,423	"
1863	282,775	"	1881	113,728	"
1864	347,594	"	1882	99,302	"
1865	465,194	"	1883	102,755	"
1866	404,252	"	1884	64,515	"
1867	338,492	\$1 25	1885	34 483	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1885.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1885.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	
Caribou .....	3	8355	2	1	1	2239	0	11 9	1	18 0	1335	14 11	2.87
Darr's Hill .....	1	31713	1	...	1	10880	0	9 0	1	10 0	4924	0 0	3.10
Fifteen Mile Stream .....	1	2479	2	...	2	898	0	9 4	0	17 0	424	15 6	3.08
Montagu .....	2	18908	1	1	...	2809	1	8 4	19	17 0	4001	6 2	3.80
Oldham .....	3	11777	1	...	1	1170	2	0 0	62	10 0	2360	12 5	3.60
Renfrew .....	2	5542	2	...	2	641	0	19 9	1	15 4	639	10 0	2.67
Sherbrooke .....	6	16050	2	1	1	2426	0	10 2	1	16 6	1238	11 0	1.38
Stormont .....	1	5891	1	1	...	707	1	4 0	1	9 21	863	15 10	2.63
Tangier .....	2	13729	2	2	...	874	0	9 9	0	17 6	431	9 14	0.56
Uniacke .....	2	4473	3	3	...	2010	0	5 7	1	11 0	576	0 12	2.31
Waverley .....	1	1135	1	1	...	223	0	15 2	1	0 0	170	2 6	2.68
Unproclaimed .....	5	38504	7	4	3	4013	1	6 1	12	16 0	5237	16 2	2.47
Total .....	29	157421	25	14	11	28890	0	15 4	62	10 0	22203	12 20	2.54

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.						DARR'S HILL.						FIFTEEN MILE STREAM.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	2	784	31	138	62	19	0	1	2290	91	900	189	0	0	1	18	...	74	34	10	0
February .....	2	845	34	...	..	..	..	1	2319	92	860	215	0	0	1	79	3	88	58	0	0
March .....	3	395	16	130	39	7	12	1	2500	100	960	260	0	0	2	204	8	56	24	0	0
April .....	2	622	25	78	35	2	12	1	2342	92	856	247	0	0	2	186	7	167	63	10	0
May .....	3	1192	47	373	177	2	0	1	2317	91	843	414	0	0	1	225	9	270	116	10	0
June .....	3	805	33	104	45	13	0	1	2619	104	875	356	0	0	2	200	8	...	...	..	..
July .....	4	1183	47	146	89	4	1	1	2450	98	965	304	0	0	2	466	18	10	8	10	0
August .....	4	659	26	257	183	18	14	1	2900	116	960	725	0	0	1	353	14	40	17	0	0
September ....	4	659	26	145	160	12	8	1	3294	131	954	277	0	0	1	245	10	60	35	0	0
October .....	2	605	24	271	43	19	13	1	2590	103	937	498	0	0	1	206	8	45	21	10	2
November ....	2	309	12	356	240	1	6	1	2875	115	865	919	0	0	1	129	5	45	23	13	1
December .....	2	297	12	241	157	14	17	1	3217	130	905	520	0	0	1	168	6	43	22	12	3
Totals .....	3	8355	...	2239	1335	14	11	1	31713	...	10880	4924	0	0	1	2479	...	393	424	15	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH	MONTAGU.						OLDHAM.						RENTFREW.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January . . . .	1	944	38	86	142	16	0	4	856	34	96	127	14	23	2	449	18	76	93	1	0
February . . . .	..	1030	41	123	212	5	0	4	1221	50	107	264	17	13	2	344	13	...	...	..	..
March . . . . .	..	1014	41	171	351	16	0	5	1464	59	83	127	2	7	2	453	18	...	...	..	..
April . . . . .	2	1167	46	60	148	8	0	3	1146	45	101	79	2	17	2	382	15	...	...	..	..
May . . . . .	2	955	40	169	396	15	0	3	1226	50	119	111	9	14	2	485	19	56	98	15	0
June . . . . .	2	2529	101	6	4	10	6	2	1139	45	156	124	9	16	2	393	16	135	165	19	0
July . . . . .	2	1908	76	229	362	8	0	4	1123	45	100	330	16	17	1	416	16	...	...	..	..
August . . . . .	1	1766	70	239	593	4	0	4	1139	45	46	298	17	0	1	581	23	...	...	..	..
September . . .	1	2344	94	376	1384	5	0	3	1128	45	...	...	..	..	1	689	27	...	...	..	..
October . . . . .	2	1980	77	459	164	16	5	2	495	18	123	508	0	16	2	493	20	17	3	7	0
November . . . .	2	1725	69	451	135	17	15	2	390	16	123	127	17	2	2	415	16	120	98	0	0
December . . . .	2	1545	62	440	104	5	0	2	450	17	116	260	4	0	2	442	17	237	180	8	0
	..	18908	...	2809	4001	6	2	3	11777	...	1170	2360	12	5	2	5542	...	641	639	10	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERRBROOK.						STORMONT.						TANGIER.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	6	1809	72	211	162	2	0	2	792	31	75	175	19	0	2	1476	60	181	107	4	0
February .....	5	1440	58	171	117	15	0	2	853	34	69	146	6	0	2	1883	75	111	63	0	0
March .....	5	1430	57	122	88	15	0	1	602	24	50	77	12	0	2	1685	67	140	48	11	2
April .....	5	1456	58	130	90	10	0	2	622	25	60	89	18	0	2	939	39	13	6	3	0
May .....	6	1352	54	280	93	9	0	1	495	19	58	68	14	0	2	1120	45	41	17	17	12
June .....	7	1326	51	185	57	1	0	1	410	16	37	48	2	0	2	1448	59	....	....	..	..
July .....	10	1350	54	421	101	5	0	2	611	24	72	74	7	0	3	1460	59	....	....	..	..
August .....	9	910	36	112	30	3	0	1	322	13	58	63	4	0	2	386	15	....	....	..	..
September ..	6	1324	53	229	167	14	0	1	417	17	85	49	6	0	2	360	14	64	20	12	0
October .....	4	1080	43	136	120	0	0	2	327	13	27	13	5	10	2	1008	40	120	63	8	0
November .....	5	1196	47	212	108	0	0	1	284	11	83	39	18	0	2	1053	40	74	63	11	0
December .....	4	1377	55	217	101	11	0	1	156	9	33	17	4	0	2	911	36	130	41	3	0
Totals .....	6	16050	....	2426	1238	11	0	1	5891	....	707	863	15	10	2	13729	....	874	431	9	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNCLACK.						WAVERTY.						UNPROCLAIMED, ETC.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January ....	1	198	8	54	9	15	0	..	...	...	...	...	..	..	3	2668	106	277	435	6	16
February ....	1	150	6	219	61	13	0	1	20	1	...	...	..	..	7	2465	98	132	71	3	15
March .....	1	100	4	52	21	3	0	1	60	2	4	6	9	0	9	3284	123	323	278	14	21
April .....	1	275	11	154	57	16	22	1	76	3	...	...	..	..	2	2166	86	466	259	0	0
May .....	2	295	12	98	26	19	0	1	68	3	8	6	9	0	4	2468	97	574	324	15	0
June .....	3	668	26	279	85	7	21	1	214	8	26	19	12	0	5	3068	123	417	356	4	18
July .....	3	575	23	245	78	0	0	1	148	6	20	19	4	0	7	3661	146	425	975	17	0
August .....	3	440	18	208	56	19	22	1	115	5	15	13	0	0	7	3830	152	404	783	4	0
September ..	3	552	22	205	65	14	21	1	247	10	109	83	0	6	7	3250	130	171	518	14	0
October .....	2	431	19	143	17	8	0	1	...	...	...	...	..	..	5	4133	165	369	595	13	4
November ..	3	382	15	179	40	9	7	1	...	...	41	22	8	0	4	3843	153	243	323	0	0
December ....	3	407	12	174	54	13	15	1	187	7	...	...	..	..	3	3668	143	212	316	3	0
Totals ....	2	4473	...	2010	576	0	12	1	1135	...	223	170	2	6	5	38504	...	4013	5237	16	2

# GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
<b>Total.</b>	<b>389180</b>	<b>4</b>	<b>15</b>	<b>524813</b>	.....			<b>3,637,614</b>	.....	.....

INTERCOLONIAL RAILWAY.

Statement showing the quantities, in tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1885.

MONTHS.	ACADIA.	ALBION.			CHIGNECTO.	DUNSMOND.	SPRING HILL.			VALE.	
		Round.	Small.	Coke.			Run of Mine.	Small.	Round.	Round.	Small.
January	.....	2589	24	.....	.....	21	1421	.....	.....	6761	.....
February	22	5778	25	9	.....	.....	3089	20	12	2043	.....
March	43	3802	75	.....	13	.....	2987	.....	11	2424	.....
April	26	4459	37	.....	.....	16	6107	.....	.....	4347	.....
May	.....	2525	158	.....	.....	.....	6558	.....	.....	3098	.....
June	.....	1784	.....	12	.....	.....	9902	.....	.....	5213	.....
July	.....	89	21	.....	.....	.....	.....	.....	4775	5225	.....
August	.....	.....	10	.....	.....	.....	.....	.....	6284	3553	.....
September	.....	.....	114	12	.....	.....	.....	.....	10048	5982	.....
October	.....	.....	150	.....	.....	.....	.....	.....	7541	6801	.....
November	.....	.....	15	.....	.....	.....	.....	80	6896	5317	.....
December	.....	.....	.....	14	.....	.....	.....	57	7755	6470	11
Totals	91	21,026	629	47	18	37	30,064	157	43,322	57,234	11

MONCTON, N. B., January 28th, 1886.



## INTERCOLONIAL RAILWAY.

*STATEMENT, showing the number of tons of Coal received from Mines in Nova Scotia during the year ending the 31st December, 1885.*

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax .....	40232	Moncton .....	13984
Bedford .....	454	Salisbury .....	1445
Windsor Junction ....	5138	Peticodiac .....	285
Wellington .....	98	Penobsquis .....	1036
Enfield .....	227	Sussex .....	558
Elmsdale .....	200	Apohaqui .....	18
Milford .....	77	Norton .....	28
Shubenacadie .....	283	Passekeag .....	14
Stewiacke .....	553	Hampton .....	650
Brookfield .....	89	Rothsay .....	138
Truro .....	6579	Coldbrook .....	4915
Valley .....	12	St. John .....	24203
Riversdale .....	10	Berry's Mills .....	22
West River .....	12	Weldford .....	24
Glengarry .....	18	Kent Junction .....	467
Hopewell .....	1230	Chatham Junction ....	334
Stellarton .....	47	Derby .....	36
New Glasgow .....	14093	Newcastle .....	69
Pictou Landing .....	48433	Bathurst .....	500
Belmont .....	58	Petite Roche .....	22
East Mines .....	72	Jacquet River .....	16
Londonderry .....	43275	New Mills .....	24
Wentworth .....	30	Charlo .....	6
Greenville .....	33	Dalhousie Junction ....	80
Thomson .....	18	Campbellton .....	146
Oxford .....	406	Little Metis .....	6
River Philip .....	6	St. Octave .....	6
Athol .....	6	Ste. Flavie .....	31
Maccan .....	45	St. Luce .....	4
Nappan .....	105	Rimouski .....	154
Amherst .....	3359	Trois Pistoles .....	19
Aulac .....	255	Riviere du Loup .....	59
Sackville .....	1868	St. Paschal .....	13
Dorchester .....	945	St. Charles .....	12
Memramcook .....	336	St. Henri .....	5508
Painsec Junction .....	6	Pointe Levis .....	15620
Shediac .....	264	Chaudiere (Local) .....	76054
Point du Chene .....	51	" (West of) .....	68609
			384338

From the following Stations :

STATIONS.	No. Tons.
Drummond . . . . .	24260
Hopewell . . . . .	1527
Stellarton . . . . .	80514
New Glasgow . . . . .	24960
Spring Hill . . . . .	248903
Maccan . . . . .	4174
Total . . . . .	384338

19363 tons of Coke forwarded from Stellarton to Londonderry.  
MONCTON, N. B., *January 28th, 1886.*

## EXPORTS FROM HALIFAX.

*Products of the Mine year ending December 31st, 1885.*

	Produce of Canada.		Not Produce of Canada.	
Coal . . . . . Tons.	22,713	\$ 72,532		
Gold . . . . .	....	397,902		
Gold Quartz . . . . .	....	150		
Gypsum . . . . . Tons.	217	1,839		
Oils, Mineral . . . . . Gals.	1,485	486	1,396	\$ 170
Antimony . . . . . Tons.	758	33,095		
Manganese . . . . . Tons.	22	1,399		
Salt . . . . . Bush.	....	....	29,652	6,129
		<u>\$507,403</u>		<u>\$6,299</u>

# FINANCIAL STATEMENT.—GOLD, &c.

Mines Department for twelve months ended 31st December, 1885.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Total.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Total.
Caribou .....	\$114 00	\$ 281 59	\$ 395 59	.....	.....	\$ 9 68	.....	\$ 9 68
Darr's Hill .....	.....	1473 12	1473 12	.....	.....	.....	.....	.....
Fifteen Mile Stream .....	372 00	.....	372 00	.....	.....	.....	.....	.....
Gay's River .....	2 00	.....	2 00	.....	.....	.....	.....	.....
Lawrencetown .....	24 00	.....	24 00	.....	.....	.....	\$ 11 60	11 60
Montague .....	178 00	1416 72	1594 72	.....	.....	78 88	10 00	88 88
Oldham .....	220 00	795 68	1015 68	.....	.....	31 17	40 00	71 17
Ovens .....	18 00	2 25	20 25	\$ 2 00	.....	.....	.....	2 00
Renfrew .....	52 00	209 90	261 90	.....	.....	10 51	32 00	42 51
Sherbrooke .....	278 00	471 91	749 91	32 00	.....	24 03	400 80	456 83
Stormont .....	612 00	362 47	974 47	.....	.....	10 98	37 00	47 98
Tangier .....	16 00	302 92	318 92	.....	.....	12 76	.....	12 76
Uniacke .....	.....	70 69	70 69	.....	.....	12 56	130 00	142 56
Waverly .....	244 00	36 35	280 35	.....	\$ 19 64	90	.....	20 54
Wine Harbor .....	162 00	35 37	197 37	.....	.....	1 77	.....	1 77
Unproclaimed .....	1362 00	1624 14	2986 14	24 00	184 84	63 48	315 57	587 89
Prospecting Licenses .....	.....	.....	4459 01	.....	.....	.....	.....	262 41*
	\$3654 00	\$7083 11	\$15196 12	\$58 00	\$204 48	\$256 72	\$ 976 97	\$1758 58

\*Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1885.

COUNTIES.	RECEIPTS.				EXPENDITURES.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'm Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis .....	\$ 20 00	.....	.....	\$ 20 00	.....	.....	.....
Antigonish .....	120 00	\$ 50 00	.....	170 00	.....	.....	.....
Cape Breton .....	240 00	350 00	\$ 42118 42	42708 42	.....	\$ 946 70	\$ 946 70
Colchester .....	140 00	.....	.....	140 00	.....	.....	.....
Cumberland .....	240 00	250 00	26147 79	26637 79	.....	720 00	720 00
Digby .....	40 00	.....	.....	40 00	.....	.....	.....
Guysborough .....	60 00	.....	.....	60 00	.....	.....	.....
Halifax .....	20 00	.....	.....	20 00	.....	.....	.....
Hants .....	120 00	.....	.....	120 00	.....	.....	.....
Inverness .....	200 00	25 00	9 70	234 70	.....	.....	.....
Kings .....	.....	.....	.....	.....	.....	.....	.....
Pictou .....	560 00	.....	33135 34	33695 34	\$20 00	472 00	492 00
Richmond .....	.....	50 00	.....	50 00	20 00	.....	20 00
Victoria .....	40 00	25 00	.....	65 00	.....	.....	.....
Yarmouth .....	20 00	.....	.....	20 00	.....	.....	.....
Examinations .....	.....	.....	.....	52 00	.....	.....	217 92
Fines .....	.....	.....	.....	.....	.....	.....	36 67
	\$1820 00	\$750 00	\$ 101,411 25	\$ 104,033 25	\$40 00	\$2138 70	\$2433 29

# ABSTRACT ACCOUNT.

*Receipts and Expenditure for the twelve months ended 31st December, 1885.*

RECEIPTS.		EXPENDITURE.	
Licenses to Search.....	\$ 182,000 00	Return Licenses to Search.....	\$ 40 00
" Work .....	750 00	Salaries and Surveys.....	2138 70
Royalty .....	101,411 25	Fines .....	36 67
Examinations .....	52 00	Examinations .....	217 92
	<u>\$104,033 25</u>		<u>\$ 2433 29</u>
Rents .....	\$ 3654 00	Return Rents.....	\$ 58 00
Royalty .....	7083 11	" Royalty .....	204 48
Prospecting Licenses.....	14459 01	Royalty Commission.....	256 72
	<u>\$ 15196 12</u>	Salaries and Surveys.....	976 97
		Return Prospecting Licenses.....	262 41
			<u>\$ 1758 58</u>
		General Expenses.....	\$4906 08
		Postage .....	131 00
		Stationery and Printing.....	930 18
			<u>\$ 5967 26</u>
	<u>\$ 119,229 37</u>		<u>\$10159 13</u>



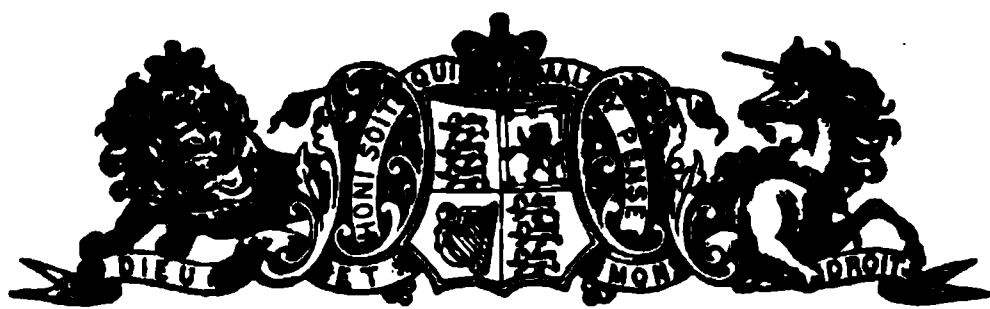




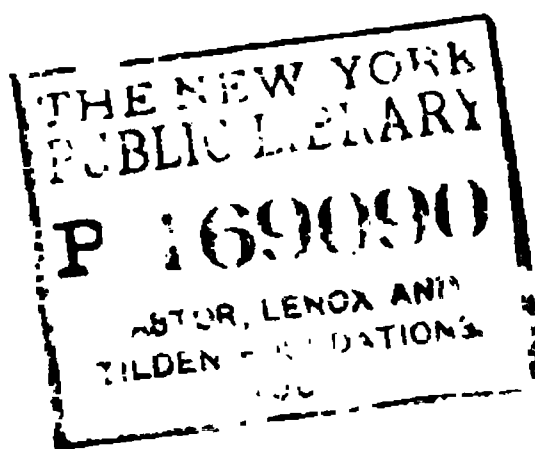


**REPORT**  
**OF THE**  
**DEPARTMENT OF MINES,**  
**NOVA SCOTIA,**  
**FOR THE YEAR 1886.**

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**HALIFAX, N. S.**  
**COMMISSIONER OF PUBLIC WORKS AND MINES,**  
**QUEEN'S PRINTER.**  
**1887.**



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# DEPARTMENT OF MINES.

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## REPORT FOR THE YEAR 1886.

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*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the  
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,  
*Commissioner of Public Works and Mines.*

HALIFAX, March 2nd, 1887.



# REPORT

ON THE

## MINES OF NOVA SCOTIA.

By EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(*Member of the American Institute of Mining Engineers, etc.*)

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, March 1st, 1887.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

*Commissioner of Public Works and Mines.*

SIR,—I beg leave to submit the following report on the Mines and Minerals of Nova Scotia, and the progress of mining, during the year 1886.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1886, compared with that of the previous year :

		1885.	1886.
Gold.....	Ounces....	22,203	23,362
Iron Ore.....	Tons.....	48,129	44,388
Manganese Ore.....	" .....	353½	427
Barytes .....	" .....	300	230
*Antimony.....	" .....	758	645
Coal raised.....	" .....	1,352,205	1,502,611
*Gypsum .....	" .....	87,644	123,753
Building Stone.....	" .....	3,827	8,000
Coke made .....	" .....	30,185	31,604
Limestone.....	" .....	16,429	20,265
Grindstones, etc .....	" .....	2,208	1,600
*Moulding Sand.....	" .....	.....	200

\* Amount exported.



Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report.

I also beg to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act.

Their reports this year contain some interesting statistics of the pumps used for freeing our coal mines from water, the dimensions of the pumps, supply of steam, burden, and total amounts pumped being given in tabular form.

During the year 1885-6 the working of our coal mines was continued steadily, and presents few new features of interest. The discovery of gold bearing veins in the counties of Lunenburg, Queens, and Yarmouth, has led to the opening of several promising mines, at Whiteburn, Brookfield, Carlton, etc., and it is confidently expected that the year 1887 will see a number of equally valuable finds.

I regret that I am unable to chronicle any further advance in the development of our most important resource, the iron ore deposits. The works at Londonderry have continued as usual, and it is expected that before long a renewed impetus will be given to their operations which are closely allied to the chief source of our mineral revenue.

In accordance with arrangements entered into between Sir Charles Tupper, chairman of the Canadian Commission for the Colonial and Indian Exhibition, and your honorable Government, it was agreed that as complete an exhibit as possible of the mineral productions of this Province should be forwarded to the Exhibition, and shown *en bloc* as part of the Canadian mineral exhibit. The names of all parties desiring to exhibit in this manner through the Government of Nova Scotia were to be attached to their specimens, and they retained all rights and privileges of ordinary exhibitors.

As the understanding was arrived at near the close of the year 1885, and an early date was fixed for the shipment of specimens, the Provincial collection was not nearly as complete as could be desired. At least twelve months are required for the proper collection of a systematic set of the economic minerals of Nova Scotia. The collection was made with all possible speed, and reached the Exhibition safely, and was much admired by mining men and others connected with metallurgy, etc.

As usual, a generous assistance was given by the various coal companies, and large and handsome specimens were secured. The following list from the official catalogue will give an idea of the extent of the Provincial Exhibit:—

General Mining Association, Sydney Mines—1 block Coal, 1200 lbs.

Low Point, Barasoi's, and Lingan Mining Co., Cape Breton—1 block of Coal, 1000 lbs., from Low Point Mine. 1 block of Coal, 1000 lbs., from Lingan Mine.

International Coal Mining Co., Bridgeport, Cape Breton—1 block of Coal, 1000 lbs.

Sydney & Louisburg Coal and Railroad Co., Reserve Mines, Cape Breton—1 block of Coal, 400 lbs.; sample of Coke, 200 lbs.

Glace Bay Mining Co., Glace Bay, Cape Breton—1 block of Coal, 300 lbs.

Gowrie Coal Mining Co.—1 block Coal, 400 lbs.; sample Patent Fuel; Coal Fossils.

Old Bridgeport Mines, Cape Breton—1 Block of Coal, 300 lbs.

Cumberland Railway and Coal Co., Springhill, Cumberland County—1 column of Coal, 11 feet high; 1 block of Coal, 200 lbs.; sample of Nut Coal, 120 lbs.; 1 block of Coal, 900 lbs.

Joggins Coal Mining Co., Cumberland County—1 column of Coal, 1000 lbs.

Halifax Company, limited, Albion Mines, Pictou County—sample of Coke; 1 block "McGregor Coal; Sample "McGregor" Nut Coal; Sample "Third Seam" Coal—900 lbs.

Vale Coal Co., New Glasgow, Pictou County—sample of "McBean" Coal, 250 lbs.; sample of "six feet" Coal, 250 lbs.

Acadia Coal Co., Stellarton, Pictou County—sample Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.

Intercolonial Coal Mining Co., Westville, Pictou County—sample of Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.

R. H. Brown, Sydney Mines, Cape Breton—Coal Fossils.

J. H. Bartlett, Springville, Pictou County—Spathic Iron Ore, 200 lbs.; Specular Iron Ore, 200 lbs.; Limonite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.

The Government of Nova Scotia—Red Hematite, 150 lbs., Stewiacke, Colchester County.

Chas. Kenny, Salmon River, Guysboro County—Specular Iron Ore, 200 lbs.

Thomas Callahan, Manchester, Guysboro County—Specular Iron Ore, 200 lbs.

A. Cumming, Melrose, Guysboro County—Specular Iron Ore.

E. T. Moseley, Sydney, Cape Breton—Red Hematite.

Government of Nova Scotia—Chilled Iron, Londonderry Mines, Colchester County; Bog Iron Ore, Liverpool, Queen's County.

D. McLaughlin, Shubenacadie—Argentiferous Galena, Smithfield, Colchester County; Marble, 100 lbs., Marble Mtn., Cape Breton; Marble, 100 lbs. Marble Mtn., Cape Breton; Lime from above. Gypsum Rock, Shubenacadie, Hants County; Plaster made from above.

E. W. Dimock, Windsor, Hants County—Gypsum, 200 lbs., Windsor.

## STEEL COMPANY OF CANADA.

*Londonderry, Colchester Co.*—Rolled Axle Blank, prepared for the hammer, made from puddled iron, squeezed in rotary squeezer and rolled into puddled bar, 5 in. wide,  $\frac{1}{8}$  in. thick and 4 in. wide,  $\frac{1}{8}$  thick. Piled—9 in. wide, 10 tiers high. Heated in re-heating furnace on a sand bottom, rolled in an 18 in. train, and subject to the following tests:—

Four blows at 9 feet and two blows at 11 feet of a 2000 lbs. weight, striking midway between solid iron supports placed 8 feet apart. Blank turned over after each blow. The deflection after each blow was found to be as follows:—

1 st blow,	defection	$1\frac{5}{8}$ ,	drop of 9 feet,	weight 2000 lbs.			
2nd	"	"	$2\frac{3}{8}$ ,	"	"	"	"
3rd	"	"	$2\frac{1}{8}$ ,	"	"	"	"
4th	"	"	$2\frac{1}{8}$ ,	"	"	"	"
5th	"	"	$2\frac{5}{8}$ ,	"	"	"	"
6th	"	"	$2\frac{5}{8}$ ,	"	"	"	"
7th	"	"	$4\frac{1}{2}$ ,	"	"	"	"

Taken thence to hydraulic press and bent until the ends came into contact, without showing the least fracture, weighing about 300 lbs.

1 Puddled Ball, weighing about 165 lbs.

1 Puddled Bloom " " 205 lbs.

## SAMPLES BAR IRON.

1 Piece	$2\frac{1}{4}$	inches square,	Sieman's iron.
1	"	$3 \times 1\frac{1}{4}$	" " "
1	"	$\frac{5}{8} \times \frac{1}{8}$	" " "
1	"	$\frac{7}{8}$	" round, "
1	"	$\frac{1}{2}$	" " tied in a knot.
1	"	$\frac{1}{4}$	" " "
1	"	$1 \times \frac{7}{8}$	" Sieman's Horse Shoe iron.
1	"	$\frac{7}{8} \times \frac{1}{2}$	" " "
2	"	$3 \times \frac{1}{8}$	" Muck Bar, weighing about 150 lbs.
1	"	$6 \times 1$	" Siemen's iron.
1	"	$4 \times 1$	" "
1	"	$1 \times \frac{7}{8}$	" "
1	"	$3 \times 1\frac{1}{4}$	" "
1	"	$\frac{3}{4}$	" round, "
1	"	1	" " "
1	"	$1\frac{1}{4}$	" square, Siemen's Best iron.
1	"	$1\frac{1}{8}$	" " "
2	"	$1\frac{1}{4} \times 1\frac{3}{8}$	" Siemen's Link iron for cars, weighing about 150 lbs.

The latter stood the following tests, viz:—

Ultimate tensil strength, 53,947 lbs. per square inch.

Reduction at point of fracture, 31 per cent.

Elongation in 12 inch diameters, 26      "

1 Link  $1\frac{1}{4} \times 1\frac{3}{8}$ , ready for use.

1 Piece  $1\frac{1}{4} \times 1\frac{3}{8}$ , Siemen's Link iron, cold bent.

1 Piece Brown Hematite Ore from West Mine, weighing about 5000 lbs.

2 Pieces Specular Ore and 2 pieces Red Hematite Ore, East Mine, weighing about 2000 lbs.

3 Pieces Spathic Ore, from West Mine, weighing about 2000 lbs.

2 Pieces Brookfield Limestone.

2    "    West Mine      "

1    "    Ankerite.

1 Boulder      "

The latter occuring in the Brown Hematite—weighing in all about 900 lbs.

1 Piece Totten Ore, from East Mine, being a mixture of Ankertite, Spathic and Hematite Ore, weighing about 800 lbs.

1 Piece Brown Hematite, from West Mine, weighing about 2000 lbs.

1 Bar No. 1 Pig Iron.

1    "    "    2      "

1    "    "    3      "

1    "    "    4      "

1    "    Car Wheel iron, weighing about 500 lbs.

#### ANALYSIS OF ORES, ETC.

	Brown Ore.	Totten Ore.	Specular Ore.
Insoluble Matter.....	15.97	1.95	0.58
Ferric Oxide .....	67.04	13.82	99.39
Ferrous Oxide.....	.....	4.26	0.52
Alumina.....	3.62	1.13	
Maganese.....	.....	0.86	
Maganic Dioxide.....	1.90	.....	
Lime .....	0.41	33.31	
Magnesia .....	0.18	6.09	
Carbonic Anhydride.....	.....	34.77	
Water of Hydration.....	10.17	3.20	Trace.
	<u>99.29</u>	<u>99.39</u>	<u>100.29</u>
Metallic Iron.....	46.93	12.98	69.81
	Spathic Ore.	Ankerite.	
Insoluble Matter.....	.....	0.19	
Calcic Carbonate.....	1.92	54.96	
Ferrous Carbonate .....	68.15	21.92	
Maganous Carbonate .....	1.87	1.29	

## COAL TRADE.

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The total sales for the year 1886 amounted to 1,373,666 tons, made up of 789,006 tons of round, 305,322 tons of run of mine, and 279,338 tons of slack coal, as compared with 1,254,510 tons sold during the year 1885.

The following are the most noticeable points in the coal trade.

The home sales were 460,237 tons compared with 444,652 tons in 1885 and 493,050 tons in 1884.

The Province of Quebec took 538,762 tons, against 493,917 tons in 1885, and 396,782 tons in 1884.

The sales to New Brunswick were 175,918 tons compared with 148,634 tons in 1885.

Newfoundland took 71,476 tons, against 74,322 tons in 1885.

The sales to Prince Edward Island were 49,168 tons against 52,770 tons during the preceding year.

The West Indian sales were 16,721 tons compared with 5,732 tons in 1885.

The sales to the United States comprise 22,127 tons of round 35,479 tons of slack, and, 3,040 tons of run of mine coal, compared with 10,497 of round and 23,986 of slack during the previous year.

The increased sales to the United States were largely due to the strike among the coal mines in the spring. Had the strike taken place a few weeks later very large amounts would have been shipped, but the opening of navigation was retarded by drift ice, and the coal sent forward went in the early part of the second quarter, the total shipments to the end of that quarter being 38,697 tons.

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## CUMBERLAND COUNTY.

The total sales of this county amounted to 416,266 tons, against 340,535 tons in 1885, and 258,405 tons in 1884.

The home sales were 103,886 tons against 83,953 tons in 1885.

The sales to New Brunswick were 118,088 tons, compared with 92,872 tons during the preceding year.

The Province of Quebec took 188,935 tons, as compared with 163,303 tons in 1885.

#### COLLIERIES.

*Chignecto.*—During the past year a few men have been employed in getting a small amount of coal, and in keeping the pit in order. The roof and upper portion of this seam at this mine, as well as at the Scotia colliery, contains a good deal of pyrites and clay, which gradually heats and takes fire if water finds access to it. These smouldering fires have given much trouble along the crop working in this seam, but hitherto the deeper workings of the Chignecto mine have been free from them. Last fall however it was found necessary to build off some of the bords in No. 4 Balance, as there were plain signs of heating. Arrangements have been made to keep both air and water from passing into the heated bords, and it is anticipated that no serious results will ensue.

*Joggins.*—Work has been continued as usual during the year, and the levels have been extended to the faults. The output was 22,243, against 17,664 tons in 1885.

A little work has been done at the Minudie, Milner & Lawson mines.

At the Patrick mine, near Macan, some prospecting work during the summer showed the outcrop of a seam of coal said to contain six feet of coal with a shaley coal parting, the bottom bench two feet thick being a canneloid coal, and apparently well adapted for gas. The coal is of excellent quality, as appears from the following analysis:

Moisture.....	1.00
Volatile Combustible Matter .....	55.61
Fixed Carbon.....	35.90
Ash.....	7.00
	<hr/>
	100.00
Sulphur.....	.50

and the work of preparing the mine for regular mining was continued.

At the Styles mine the slope is now down 130 feet in the dip, which is about 44°. The seam contains 4 feet 2 inches of coal, with two bands of shale.

*Springhill.*—The Cumberland Railway and Coal Company have greatly enlarged their operations during the past year. The output was 416,769 tons, compared with 335,055 tons in 1885.

The Barlow seam as opened by a trial pit proved to be eleven feet thick. Arrangements are being continued to put the syndicate slope in a position for a regular output. The deepening of the East Slope will open a large field of excellent coal.

The negotiations for the construction of a railway from the Inter-colonial railway at Maccan to the Joggins mines have been followed by an active construction. The road crosses the Maccan River near the highway bridge, and from this point to the Joggins shore it follows closely the outcrop of the band of strata which carry the coal seams. Its completion will give ample facilities for an all winter outlet via Maccan, and presumably shipping accommodation will be provided where the line touches deep water.

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### PICTOU COUNTY.

The total sales were 369,026 tons, against 396,000 tons in 1885.

The home sales were 202,516 tons, against 209,428 tons in the preceding year.

The Province of Quebec took 95,499 tons compared with 145,363 tons in the year 1885.

The sales to Newfoundland, Prince Edward Island and New Brunswick present no new features of interest.

### COLLIERIES.

*Acadia Coal Company.*—The company bearing the name of the Acadia Coal Company, formerly working the colliery known by that name, now includes, pursuant to an amalgamation effected last year, the Collieries of the Halifax Company, commonly known as the Albion Mines, and those of the Vale Coal, Iron and Manufacturing Company. The present Acadia Company has now five large Collieries in running order and controls the areas formerly held by the companies referred to above. Mr. H. S. Poole continues as Agent for the Consolidated Company, and his new work will doubtless be marked by the success which has attended his management of the old Acadia Colliery. It is to be anticipated that by a concentration of shops, stores, offices, etc., etc., a perceptible reduction will be effected in the cost of the coal.

*Acadia*—Work has been carried on steadily during the past year, and the extraction of coal in the new lift systematically pursued. The output was 98,891 tons, compared with 98,150 tons in 1885.

*Albion.*—The McGregor mine was not worked during the year, but it has been kept in order and ventilated. The slopes have been continued, and the levels extended. At the Foord pit a good deal of



pumping has been done and the water level lowered considerably. The pumping has been done in the main hoisting shaft by means of two self-filling and self-discharging iron tanks, raised by the winding engine. These tanks are 8 ft., 6 in., by 6 ft., 3 in., by 3 ft., and the engine makes 40 trips each hour. The amount of water thus raised during the year is given by Mr. Madden at 873,800 gals. per day of 22 hours, and at no less than 1,599,758 tons for the whole year. The output of the Colliery was 77,807 tons, compared with 129,195 tons during the preceding year.

*Vale.*—The explorations in the McBean seam at the 1800 feet level on the east side of the fault have shown good and regular coal, and it is proposed to open it out to the rise. The new 2,400 feet level is working regularly, and the coal continues of good quality. In the six feet seam the workings have been regularly extended and improvements effected in the ventilation. The output of the colliery was 128,539 tons, compared with 96,135 tons in 1885.

*Intercolonial.*—At this mine work has been confined to the main slopes, the No. 4 slope and the second seam shaft remaining unworked. There are few new points of interest in the operations conducted here. A steam jet has been introduced for the purpose of maintaining ventilation should any accident happen to the fan. The coal raised amounted to 108,498 tons, compared with 109,139 tons during the preceding year.

Messrs. Grant & Muir worked during part of the year on a small seam of coal at Coal Brook, on the Montreal and New Glasgow area, and in the fall removed to the east end of the East River area, where arrangements were made for opening one of the seams of the marsh group.

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## CAPE BRETON COUNTY.

The total sales from Cape Breton County during the year 1886, were 588,191 tons, compared with 517,975 tons during the year 1885 and 539,064 tons during 1884.

The home sales were 153,652 tons, against 151,371 tons in 1885.

New Brunswick took 26,284 tons, compared with 28,498 tons during the preceding year.

The sales to Newfoundland were 71,018 tons, against 69,833 tons during the year 1885.

Prince Edward Island took 14,201 tons, against 13,613 tons in the year previous.

The sales to Quebec show 254,328 tons, against 215,254 tons during the year 1885.



The sales to the West Indies amounted to 11,364 tons, compared with 5,618 tons during the preceding year.

The trade with the United States was 56,606 tons, compared with 33,788 tons in 1885, and 62,565 tons in 1884.

#### COLLIERIES.

*Sydney*—The seaward extension of the workings has been steadily continued. The Francklyn Lease lying under the harbor has been worked to some extent through this mine. The greater part of the water with which the fire of last spring was drowned out, has been removed. The cause of the fire has never been positively determined, but it has been suggested that it was caused by sparks from a lamp falling among some dry timber. Mr. Neville gives some further information about the arrangements made concerning this district of the mine. The output was 139,646 tons, compared with 124,274 tons in 1885.

*Victoria*—Work has been continued steadily at this mine. The fault on the east side which was a flat lying upthrow going east was pierced. The slopes are being extended, and the lower sections are dryer than those first opened. The output was 50,156 tons, compared with 47,614 tons in 1885.

*Lingan*—In the fall, work was discontinued in this mine, and the plant removed. The old port of Lingan, is not adapted to the present requirements of the coal trade, as it is too shallow for steamers and large sailing vessels. It is proposed to re-open the seam some distance to the north and to ship over the Low Point Railway. The output was 17,688 tons, against 21,761 tons in 1885.

*Reserve*.—Work was carried on steadily during the past season, the output being 81,783, compared with 82,276 tons during the preceding year. The slope to the Emery seam is about 250 yards long and dips at the rate of one foot in four. The Emery seam as cut by it is of good quality, and from 4 ft. 9 in. to 5 ft. in thickness. A stapple has been sunk between the seams and connections made for ventilation.

*International*—The output at this mine was 118,129 tons, against 67,959 tons in 1885. Workings have been continued in the upper level and some pillars drawn. The No. 4 landings have been continued, and the new deep workings opened out. An underground engine, friction geared, with two nine inch cylinders, geared three to one, has been set to haul along the upper level. A Riggs patent screen and tippler has been erected, and found to give every satisfaction.

*Bridgeport*—Mr. Mitchell continued working, and has completed an air shaft 40 ft deep, and a reservoir, and made further improvements above ground. The output was 14,344 tons, against 13,178 tons during the preceding year.

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*Little Glace Bay.*—The working places have been extended during the summer on the system in force since the opening of the pit. A new boiler stack and foundations have been built, and the boilers removed to the rear of the winding engine. The output was 33,382 tons, compared with 39,400 tons in 1885.

*Caledonia.*—The deeps have been continued and fresh rooms won out, the greater part of last season's coal having been taken from them. The coal in this section is of excellent quality, but as a little gas is given off, caution is required in working. The output was 72,810, compared with 58,859 tons in 1885.

*Ontario.*—A little work was done in the upper portions of the mine, no attempt having been made to reach below the water level.

*Block House.*—No work of any moment was done here during 1886. In the summer the goods and chattels of the mine were seized by the sheriff and sold for arrears of royalty.

*Gowrie.*—The dip slants have been continued and are 300 yards in length, levels have been driven east and west and rooms turned away. The coal is of good quality, and from five to five and a half feet thick. The coal is raised to the pit bottom by a surface engine having a pair of 6 in. cylinders, electric signals being used. Work has been continued at the Briquette factory, and the fuel is steadily finding favor for steam and domestic purposes. The output was 93,307 tons, compared with 74,414 tons during the preceding year.

#### MISCELLANEOUS.

A few tons of coal were mined at Broad Cove and Chimney Corner in Inverness County.

A seam of coal said to be eight feet thick and of workable quality is said to have been found to the west of the Gowrie Leases at Cow Bay.

Discoveries of coal were reported from Onslow and Lower Stewiacke in Colchester County; from Oxford, and Advocate Harbor, Cumberland County; and Selma, in Hants County.

## GOLD.

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The returns show that 128,880 days' labor were performed, and that 29,010 tons of quartz were crushed, yielding 23,362 ounces, 5 dwts., an average of 16 dwts. per ton, the maximum yield being 17 oz., 10 dwts., per ton, and minimum 5 dwts.

The yield of gold is slightly larger than during the previous year, but the increase is smaller than it should be. Many of the older districts fell off largely in their production; notably Montague, Stormont, Uniacke; and the larger output of the "unproclaimed and other districts" little more than made up the deficiency.

### DISTRICTS.

**CARIBOU.**—The returns for 1886 show 2,233 ounces, compared with 1,335 ounces in 1885. On the property of the Moose River Company a good deal of work was done by tributors on the Little North and Copper leads. Bruce did some prospecting on the Taylor and Archibald properties, working in the latter two small rich leads.

Mr. Touquoy worked several leads, among which may be mentioned the North, Little North, and Copper Lead. On the first, last year's operations were continued. The South lead was opened by him for about 60 feet, this vein forms a saddle dipping west. On the Copper lead a new shaft was sunk, and about 70 feet opened.

In Caribou, Mr. Bruce worked in Lease No. 79, on the North Lead No. 1 of Mr. Touquoy, and the Lake lead was worked by Mr. Wadsworth for some American capitalists. The lead passing abruptly across the metals for some distance, resumed its normal course, widening to several feet and yielding rich quartz.

**DARR'S HILL.**—The Dufferin Gold Mining Company has proved the most permanent of the gold mining corporations of the Province. During the past year the returns show that 11,628 tons of quartz yielded 6,509 ounces, being a total to date of 24,556 ounces from 44,881 tons of quartz. During the past season their works have been pushed to the east, the quartz measuring from four to twelve feet in thickness. A dam has been built across the river about one half mile above the crusher dam, and power obtained to do all the pumping, hoisting, etc., by an endless wire rope, connected with friction gear, etc., at each shaft.

**FIFTEEN MILE STREAM.**—Mr. Hudson has continued working his areas, but the resumption of work on the property generally known

as the Hall-Anderson did not take place. Mr. Grant and others did some prospecting, and Mr. Walton began to test some promising leads at Caledonia.

**MONTAGUE.**—Work on the Albion areas was stopped entirely in the spring, and the district was idle until the fall, when Mr. Hale reopened the main lead on the Symond's property to the east of the mill; the vein promises well, and work will be continued.

**OLDHAM.**—Mining business has revived to some extent in this district and is in a very encouraging condition. J. E. Hardman has been sinking and drifting on the "Dunbrack" lode and has obtained some rich quartz.

E. C. McDonnell has been working the property adjoining J. E. Hardman on the "Dunbrack" lode. The lode increased in value in depth, and the returns from the quartz in the bottom was 3 oz. per ton. Mr. McDonnell intends to move his engine, hoist and pump to the 310 feet shaft and push the work forward vigorously during the coming season.

Donaldson Bros., have been working a property on the same lode and are now down 95 ft. in the main shaft. The lode has improved in value, in depth. They propose to put up appliances to carry the shaft deeper during the coming season.

**RENFREW.**—In the spring some ground was worked by Mr. Hayward, and attention was turned to deepening the shaft, which is now 300 feet deep. A large amount of ore has been blocked out, and it is expected will occupy the mill for several months.

**SHERBROOKE.**—The total returns from this district were 1,341 oz. from 2,850 tons; the smallest being 63 ounces in May, and the highest 278 ounces in March. During the season Mr. Williams worked on the New York property, re-opening the Old German pit, the lead showing from 4 to 10 inches, at the shaft bottom 180 feet deep. Several leads were opened and tested on the Wellington area. On the Pactolus stopes were carried eastward from the great open cut into the Meridian property. Work was done by Messrs. Foley, May, and others at several points, but I regret to say that mining is still dull in Goldenville.

At Cochran's Hill a little work was done on the Cumminger property by Mr. Caffrey; and Mr. R. P. Fraser continued the development of the Crow's Nest mine, where several promising leads were worked, and low grade ground tested.

**STORMONT.**—Operations have been partially suspended in this district. Tribute work has been carried on by Mr. Hewitt and others at various points. At the Narrows of Country Harbor a good deal of prospecting has been done on Johnson's Brook. Several promising leads have been found, especially on the properties of the Messrs

Cook and of Mr. Morrison. The total yield of the district was 435 ounces from 429 tons of quartz. A fifteen stamp mill has been put up, road made, etc.

TANGIER.—The returns show 360 ounces from 936 tons of quartz, compared with 431 ounces from 874 tons in 1885. A little work was done on the Strawberry Hill property. Mr. Miller worked on the Leary Lead, and Mr. Murphy took out some ground in the west end of the Nugget lode workings. In Mooseland a little work was done by Mr. Irvine, and some prospecting carried on by Messrs. Townsend, Miller and Dissoway.

UNIACKE.—Little work of note was performed here during the past season. The returns show only 320 ounces.

WAVERLEY.—Mr. Huff continued working on the American Hill, the only systematic work performed in the district.

UNPROCLAIMED and other districts.

BEAVER DAM.—This mining camp has been revived and has received considerable attention during the season from prospectors. William Yeadon has a party of 12 men in camp developing his property. He has opened up 3 leads that he estimates will pay well to work. Having put up a crusher with one battery of four stamps to test the leads as they were opened, he is now preparing to place the second battery and push the work during the coming season. He has built a dwelling house, shaft houses, barn and blacksmith shop. The mill is run by water. Several other parties are prospecting properties here.

GOLD RIVER.—Prospectors have had their interest in this place revived and have paid considerable attention to the exploration of the part of the district lying east of the river. Several large leads have been found. Webster Eaton has been opening up the Mills property and is building a crusher at the mouth of the "Branch" brook. Work has also been done by Heisler and others.

WHITEBURN.—Mining operations and prospecting have been vigorously pushed during the season. Several new leads have been opened up. Two new mills have been put in operation, one on the Parker and Douglas Property, and the Foster mill on the Parker, Cole and Wile property. The works on the Parker and Douglas Company's property have all been put up during the season. The new lead discovered in September to the westward of McBride's hill turned out very rich looking quartz and a number of people bought interests in the Parker, Cole and Wile and Annand areas and put up the Foster mill. McGuire Bros. have opened another lead on their areas.

MALEGA BARRENS is a new district, the first gold being found in June. A very large number of areas were taken up by different parties to prospect on. The outcrops of several lodes shewing gold were found on several properties, and regular mining operations were

commenced on the properties of Wharton & Co. and McGuire and Smith. A road has been built in to the mining properties. This district lies about four miles easterly from Brookfield, Queens Co.

CARLTON, YARMOUTH CO., is a new district, gold being first discovered during the early spring of 1886. Messrs. Hale and Ross acquired the title to the property of Messrs. Crosby and Wyman, and prospected the areas. The outcrop of a good streak of gold was found in the summer and the work of sinking shafts and drifting was rapidly pushed. At Christmas the shafts were down about 100 feet, with about three hundred feet of drifts and about 50 tons of rich ore taken out. Hale and Ross mine is advantageously situated in the village of Carlton, Yarmouth County, and near to the large water power of the Tusket river that drives the saw mills in that place.

CHEZZETCOOK.—On the Oxford property, a small lead running under the battery, and from one-half to three inches thick, was opened in the fall and proved very rich.

At Rawdon the two mines have continued working steadily; and the district has become a large and steady producer. Some work has been done at Gold River, Killag, Leipsigate, Pleasant River, and reports of gold finds have been received from numerous points.

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## IRON MINING.

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During the past season the Mines of the Steel Company of Canada at Londonderry have been steadily worked. The output was 44,388 tons of brown and white ores. There were also 947 tons of ankerite quarried for a flux, in addition to 13,729 tons of limestone from Mr. McDonald's quarry near Brookfield.

Discoveries of iron ore were reported from Grand Lake, Halifax Co., and from the Long Island District, Cape Breton Co. Here Mr. Greener opened the outcrop of two beds of red hematite of excellent quality up to ten feet in thickness. They are situated very favorably, being on the side of a high hill and only a few yards from deep water.

## GYPSUM.

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The exports for the year were 123,753 tons compared with 94,044 tons in 1885. Mr. Dimock shipped largely from his Windsor quarries, and 23,272 tons were extracted at Cheverie. The Messrs. McCurdy, at Baddeck, shipped about 4,000 tons from their quarries at St. Ann's Harbor.

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## ANTIMONY.

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It is stated that American capitalists have purchased the Rawdon Mine from the local owners, and propose to largely increase its production. Last year 645 tons were shipped.

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## COPPER.

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During the past season exploratory and preparatory work has been continued at the Coxheath Mines. The drifts on the various levels have shown new bodies of ore large in extent, and carrying good percentages of copper.

Mr. E. D. Peters, the well-known copper metallurgist, sums up the results of a trial on a practical scale of the Cape Breton (Coxheath) copper ores, iron ores, coke, and limestone as follows:—

1st.—That the ore can be smelted in a blast furnace producing a clean and fusible slag.

2nd.—That the Sydney Coal field produces an excellent coke that will smelt over seven times its weight.

3rd.—That the iron ore and limestone of the district furnish a cheap and excellent flux for the Coxheath.

4th.—That a light grade matte can be produced from the smelting of the raw ore without any preliminary washing.



5th.—That taking into consideration the prices of fuel, flux, and labor, copper smelting can be done far more cheaply on Sydney Harbor than at any point in the United States.

From Mr. Peters' tests it appears that 13,450 tons of ore, averaging 52 per cent. of copper, being smelted with the necessary fluxes and coke at the rate of one ton of coke to seven of mixture, yielded a clean matte of the following composition:

Copper .....	37·2
Iron .....	28·6
Sulphur .....	33·4
Arsenic .....	00·0
Antimony .....	00·0
	<hr/>
	99·2

The slag contained under one-third of one per cent. of copper.

The discovery of lodes carrying sulphur ores with copper, and rich copper pyrites was reported from the Long Island district on properties owned by Messrs. Greener, Ingraham, and others, of North Sydney.

## MANGANESE.

Mr. Stephens reports that about 200 tons were extracted at Tenny Cape.

At Onslow Messrs. Carter and Archibald took out about 20 tons in the spring, but did not work in the fall. The indications of ore are very extensive in this locality (East Onslow.) The ore hitherto mined has been found in small rounded pieces in the loamy clay and the underlying red sandstone. In the latter it also occurs in thin veins filling cleavage and shrinkage planes. The ore is extracted from open quarry faces, and after hand dressing is jigged and sorted. This ore has a shorter grain than that found at Tenny Cape, but is of excellent quality. Some ore was mined at Cheverie, Stewiacke, and Hantsport. From Wolfville there was exported 250 tons of mineral classed as "Manganese," but probably more correctly ranked as an ochre.



## DEPUTY INSPECTORS' REPORTS.

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DISTRICT OF PICTOU; COLCHESTER, AND CUMBERLAND.

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WESTVILLE, N. S.,  
31st December, 1886.

E. GILPIN, Esq.,  
*Inspector of Mines.*

DEAR SIR.—I take much pleasure in forwarding you the annual report of my inspection for the year ending December 31st, 1886.

### SPRING HILL MINES.

In my inspection of these mines I learned that gas had been frequently found in the West slope, also in East side of East slope. The management strictly fulfilled the requirements of the law in such cases made and provided. On the eleven feet seam (underlying the South slope seam) to which particular reference was made in my last report, and on which a small shaft was sunk, a slope has now been driven down about one hundred and fifty feet, where a break has occurred, and at this point a bore hole was put down and passed through a six and one-half feet seam, which either overlies the eleven feet seam, or the eleven feet seam is only six and one-half feet thick on the west side of the break. As yet, however, that particular vicinity is not fully prospected, so that it would be premature to say whether this is the eleven feet seam, so-called, or another seam that overlies it.

I have visited this mine once every month during the year, and on each occasion took measurements of the air, and found it satisfactory. The tables annexed shew in all cases the quantity circulating at the discharge. The south slope on December, 18, 1885, was down 830 feet: at the time of my last visit it was 1800 feet deep, and the sinking still in progress. The management are at present putting up a small engine on the 1300 feet level, East Slope, which slope they intend sinking for another lift.

### CHIGNECTO MINES.

During my inspection of this mine I found it in good working order, and the air satisfactory. There were however in December signs of fire on No. 4 bord of No. 3 balance, east side of mine, and the

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management have taken every precaution to enable them to keep guard and watch over the fire, and prevent it from breaking out and spreading, by building it off with brick stoppings.

#### JOGGINS MINES

Were idle in January and February; in March I found them started to work. On my visit September 16th, gas had been reported in No. 2 bord, 3rd balance; attention was drawn to the law which was thus complied with. I learned in November that the West Level had been drawn to within 70 or 80 feet of a break, and in December the management had decided to let it stand at that point. The East level is going through a break on East side.

#### SCOTIA MINE.

On my visit in January I found eleven men at work, and that they had pierced up to the top seam, three feet thick. In February it was overflowed with freshet. A few men were working in March, and it was idle again in April. In July indications of fire appeared, which in August I saw was damped out, and since that time the mine has remained idle.

#### MINUDIE AND MILNER MINES.

Some little work was done in January and February, but on all my subsequent visits they were idle.

#### S. E. FREEMAN (OLD LAWSON MINE.)

Work has been going on in a little way at this mine during part of the year. In November they started to hoist coal, and in December were putting up an engine with a view to larger operations.

#### WM. PATRICK.

During January and March some little work had been done at this mine. It remained idle from that time until my visit on December 3rd, when the management were erecting an engine house at the old slope.

#### BOSTON MINING CO.'S MINE.

In March I found 9 or 10 men at work here. On April 27, and the subsequent portion of year, it was idle.

#### STYLES MINE.

I visited this mine on two occasions, and found very little work had been done. At my last visit it was idle, and about 30 tons of coal were lying on the bank.

## VALE COLLIERY.

Gas to more or less extent has been given off in various portions of the McBean Mine during the year. In the inspection of working faces and air-ways I found the air satisfactory, but in any heads driven up-hill off the air, very strict precautions had to be used on account of the gas. The management have succeeded in driving through the "trouble" on the East side at the 1800 feet level, and extended their workings several hundred feet in the coal on East side of trouble, and have also laid rails down the slope from 1800 feet level to 2400 feet level, and are hoisting coal from that point. A perceptible increase in the volume of air will be noticed in the Greener Mine in October; the management having succeeded in getting their new air-way in operation, which with larger area, and less friction, produces this satisfactory result. An engine has been placed at 1800 feet level to hoist from lower lift to 1800 feet level, and from thence it is taken by the main hoisting engine to the surface.

## ACADIA COAL CO., WESTVILLE.

In the mine at each official visit I found the air-ways satisfactory, and the air kept up the working faces. They are taking out the pillars on the 2400 feet level successfully, and on the 3100 feet level extending levels on each side. Although a considerable amount of gas is evolved a sufficient circulation of air is kept up to working faces, and none is allowed to lie. The coal on lower lift presents a fine appearance.

## INTERCOLONIAL COAL COMPANY.

I visited this mine frequently during the year, and on one occasion two delegates, namely, John Johnson and Thomas Blackwood, appointed by the men, inspected along with me the workings of the mine, which were found satisfactory. During the summer a steam jet was placed in the up-cast shaft, and the fan stopped for several hours, during which time no men were allowed in the mine. The jet being applied restored the circulation to such a degree as indicated that in case of damage or injury to the fan the jet would keep the air to a certain extent circulating. The management have driven a place through the "dike" on the 800 feet lift, which will shorten the air return by some hundreds of yards. The Scott Pit and No. 4 slope have remained idle during the year.

## HALIFAX COMPANY.

The McGregor Pit was idle during the year, except that in November a set of men were started to pierce through a balance and obtain a better exit for the air. Ventilation by the fan was kept up during the year, and the water was taken out.

Slopes Nos. 1 and 2. During the year these slopes have been sunk further down in the seam, and at the present time the management

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are continuing their operations. No. 1 slope is now down a depth of about 1,400 feet, and No. 2 is down about 1,650 feet. At my visit in August I found the air at one point, viz.: top board on inside balance, No. 1 slope, not all that could be desired. I drew the attention of the management to this, and the defect was promptly attended to. On previous visits, and since that time, the air has been satisfactory.

Water is still being extracted from the Foord Pit by means of iron tanks, and is being lowered at the rate of about one foot per day.

JOHN MUIR & CO

Continued some small operations on the seam at Coal Brook; but during latter part of year suspended work there altogether, and leased the East River area, from B. G. Gray, Esq., Halifax, and moved their plant a few weeks ago to a small slope on said area, which slope was sunk about 100 feet; there is a seam of coal there about four feet thick, which has a good appearance.

During the month of October I visited the Acadian Iron Mines, travelled the workings, and found them well-aired. In August I visited 15 Mile Gold Stream. Travelled Hudson's mine, and the Anderson and Hall mine, and found them in good order. I attach tables giving numbers of serious accidents and causes thereof, volume of air circulating, also a tabulated statement of the various appliances used in discharging water from the mines, etc.

I am, Sir,  
Yours very truly,

WILLIAM MADDEN, JR.,  
*Deputy Inspector of Mines.*

## DETAILS OF PUMPING APPLIANCES.

COMPANY.	Appliances.	Length of Stroke.	Diameter Steam Cylinder.	Diameter Water Cylinder.	Number strokes per minute.	Steam pressure at boiler.	Distance of pump from boiler in ft.	Steam pressure at pump.	Vertical height of discharge.	Pressure of head per sq. in. lbs.	Length Steam Pipe.	Length Water Pipe.	Diameter Water Pipe.	Diameter Steam Pipe.	Average gallon discharge per day.	Tons of water raised, year 1886.	Tons of coal raised during year 1886.	REMARKS.
INTERCOLONIAL COAL COMPANY, Westville.	Cameron Pump. No. 2. Top. Bot. Mid.	36 in.	18 in.	8 in.	20 to 40	lbs. 80	480	lbs. 79½	350	lbs. 208	900	.....	.....	5 in.	60,000	104,500	108,498	Pipes covered with composition made by Mechanical Engineer.
		12 "	10 "	4 "	40 to 60	80	1380	77½	300	130	900	900	3 x 2½	2 x 2½	.....	.....	.....	Pipes covered with composition made by Mechanical Engineer.
		12 "	7 "	3½ "	40 to 60	75	1780	75	113	49	400	400	2 in.	2 in.	.....	.....	.....	Pipes covered with composition made by Mechanical Engineer.
ACADIA COAL CO. Westville.	Duplex Compound Pump.	24 "	H. P. 12 "	5½ "	45	50 lbs.	2800	40	996	433	2800	2400	.....	4 "	190,000 per day of 24 hrs.	219,000	98,891	Pipes covered with composition made by Mechanical Engineer.
		40 "	20 "	2½ "	15	60 "	1500	38	305	89	1500	600	8 "	4 "	84,000	153,300	22,943	Pipes not covered.
Joggins.	Burling and Johnston's Pump.	14 "	14 "	6 "	.....	75 "	600	50	385	167	600	600	3 "	4 "	24,000	43,800	9,148	Pipes not covered.
CHIGNECTO.	Cameron Pump.	24 "	15 "	5 "	50	80 "	1240	70	365	159	1240	1040	.....	.....	144,000	202,800	.....	Pipes covered.
		12 "	8 "	5 "	60	.....	510	.....	130	57	510	310	.....	.....	8,640	.....	.....	Pipes covered.
		30 "	30 "	8 "	25	70 "	1400	60	650	282	1400	1200	.....	6 "	234,000	.....	123,539	Pipes covered to pit head. Balance of pipes in mine exposed.
Vale Colliery. McBean Seam. Connected.	Knowles.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000	459,900	.....	Disch'rgs to mld. pump. Disch'rgs at surface. Used as a spare pump.
		24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	900	.....	.....	.....	.....	.....	Disch'rgs to mld. pump. Disch'rgs at surface. Used as a spare pump.
Greeney, or 6 ft. Seam.	Cameron Pump.	24 "	15 "	5 "	50	80 "	1240	70	365	159	1240	1040	.....	.....	144,000	202,800	.....	Pipes covered to pit head. Balance of pipes in mine exposed.
		12 "	8 "	5 "	60	.....	510	.....	130	57	510	310	.....	.....	8,640	.....	.....	Pipes covered to pit head. Balance of pipes in mine exposed.
McBean Seam. Connected.	Cameron Pump.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000	459,900	.....	Pipes covered to pit head. Balance of pipes in mine exposed.
		24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	900	.....	.....	.....	.....	.....	Pipes covered to pit head. Balance of pipes in mine exposed.

West Slope. Connected.	Top. Allison Pump.	6 ft.	30 in.	14½ in.	15	75 "	750	68	340	148	750	750	12 in.	9 "	1080,000	Disch'rgs at surface.	1976,000	750 feet of pipes covered.
	Bottom. Allison Pump.							55	310	134	680	680	12 "	6 "	1080,000	Disch'rgs to top pump.		
	Special Blake.	3 ft.	28 "	11½ in.	32	60 "	512	40	430	187	820	850	8 "	4 "	742,080		1354,296	
Cameron Pump. Connected.	Blake, not used.																	Covered from boiler to pit mouth with infu- sorial earth.
	Special, No. 7.	30 in.	22 "	9 in.	40	60 "		40							460,200		840,900	
	No. 5.	24 "	15 "	7 "	60	85 "	1508	60	278	121	1500	1400	4 "	3 "	216,000		304,200	
Slope.	No. 2.	18 "	10 "	4 "	65	85 "	1800	50	32	14	300	300	2 "	2 "	86,400	Disch'rgs to top pump.		416,739
	Cameron Pump.																	
	McGregor Pit.	Idle.																
Foord Pit.	Boxes.														18,000		32,850	77,807
LAWSON MINE.	Two	Iron Tanks.	8 ft. 6 in. x	6 ft.	6 ft.	6 in. x	6 ft.	40 tanks per ho	ur. 22 h. per day.						873,849		1589,758	
	Boxes.														8,000		1,460	
PATRICK MINE.	Boxes.														9,600		17,520	
BOSTON.	Idle.																	
SCOTIA.	Idle.																	
MINUDDIE.	Idle.																	
MILNER.	Idle.																	

SPRING HILL MINES.

HAIRFAX COMPANY.

*Accidents, Fatal and Serious, during year 1886.*

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	Jan. 11...	Vale Colliery..	— Livingston ...	Boy .....	Leg injured. Jammed between two boxes.
2	Feb. 9....	Halifax Co....	James Ferguson...	Trapper .....	Leg and arm broke; box running over him.
3	May 3 ...	Spring Hill ...	Murdoch McLeod ..	Miner .....	Killed by a fall of roof.
4	May 5 ...	Intercolonial ..	David Hayman .....	Boy .....	Box passed over him. Died 12th May.
5	May 19 ..	Vale .....	William Carroll .....	Miner .....	Leg injured; coal falling on him.
6	Aug. 26 ..	Acadia .....	James McCoul .....	" .....	Burnt, whilst e powder.
7	Sept. 8 ...	Intercolonial ..	David McPherson..	" .....	Leg broken; fatal pillar.
8	Nov. 1 ...	Spring Hill ...	George Turner .....	" .....	Fatal fall of top coal.
9	Nov. 3 ...	" .....	Adam Lorimer .....	" .....	Leg bruised; came in contact with rope in slope.
10	Dec. 22..	" .....	Isaac Conway .....	" .....	Burned slightly with gas.

*Volume of Air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines during year 1886.*



## CAPE BRETON.

BRIDGEPORT, January 5, 1887.

E. GILPIN, ESQ.,

*Inspector of Mines:*

DEAR SIR,—I beg leave to forward a report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1886.

## SYDNEY MINES.

This mine I have visited twelve times during the year, and found it working in the usual systematic manner. On the south side, in the main entry, in several places part of the roof has been taken down for the purpose of making it safe and increasing the area of the air course. This is decidedly an improvement, and if more had been done it would be still better. On the north side a roadway has been driven about 70 chains through the pillars and old workings for the purpose of straightening and shortening the haulage in that direction. In March, 1885, when the north-eastern district was submerged for the purpose of putting out the fire, I learn from Mr. Brown, that the quantity of water let in was 74,000,000 gallons; out of that quantity there has been 26,000,000 gallons pumped out in the year 1885, and in 1886 there has been pumped 18,500,000 gallons, and there still remains to be pumped 29,500,000 gallons. The water is now under control and divided in two sections. The north section will probably be pumped out next season, and then attention will be directed to the east section. I understand that it is the intention of Mr. Brown to leave a strong barrier between this and the new works for the purpose of making a standage for water in case at any time leakage may take place in the iron tubing of the shaft. This would save the working parts of the pit and give ample time for repairs.

## VICTORIA MINES.

This mine has been worked vigorously during the past year. I have made eleven official visits through it, and found the Mines Regulation Act observed. The ventilation is good on both sides of the slopes. On the east side there are four different splits, all returning separately to the upcast. A little gas began to show in the west levels last March, and as soon as it was brought to the notice of the agent he immediately put on shot-firers. The levels have been extended on both sides. A new pump has been placed at the bottom of the centre slope to replace the two referred to in previous reports. It is the same kind as at Langan, and designed by Mr. Elliot, engineer of the Langan Mines. Those pumps give good satisfaction. On the surface at the mine there has been put up a new reciprocating screen for the purpose of making nut coal.

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**BARRASOIS.**

There has not been any work done here for the last seven months of the year.

**LINGAN MINES.**

I visited this mine ten times during 1886. It was kept working pretty steadily, but did not ship much coal. It is now closed down the rails and pumps have been taken out. It will likely fill with water to the upper level that runs to the sea shore. In travelling through this mine, I found that the pillars were strong and regular, and the timbering good. I must say that the ventilation was good through all parts of the mine.

**OLD BRIDGEPORT.**

I have visited this mine nine times. The headways mentioned in my last report have been driven and a shaft sunk to connect with one of them for the purpose of ventilation. The other, as was intended, has not been yet driven through the surface for a travelling road. The management says that it is the intention to drive this through next season, and build a furnace and cupola. This is much required, as I found on some of my visits in hot and calm weather, that the air was rather feeble at the face of some of the workings on the south side of the pit. The attention of the underground manager was drawn to a weak part of the roof on the south side, where the pillars were rather far apart, and he promised to secure it. In all other matters the requirements of the law are satisfied.

**INTERNATIONAL.**

I have visited this mine thirteen times during the past year. The dips have been driven to gain a new lift, where it is the intention to place thirty pairs of miners to work next season. A new Knowles pump is being placed there for the purpose of pumping the water to the upper level. A little gas has made an appearance at the face of the dips; it is the first of any account that has been seen at the mines. The ventilation is a little sluggish in some parts of the lower workings owing to the great distance from the furnace, and the large area it has to go through; however, it is well distributed and so far gives satisfaction. A new engine has been placed at the south side of the pit bottom for the purpose of drawing the coal to that point by means of a tail rope. I noticed at this mine, along the engine plane, that the corners of the refuge or man-holes have been whitewashed. I think this a very good idea, and if adopted in all the mines, would save some accidents, as the entrance can be seen at a greater distance. The cost is very small, a little lime and water answering the purpose, and where the pit is not damp, would remain bright a long time.

## RESERVE MINE.

I made fourteen visits to this mine during the past year. The ventilation at this mine is about the same as 1885. On some of my inspections I found it a little thick in some of the boards, owing to so much powder being used there. The underground manager urged the men to fire in the afternoon, and this had a better effect. I may also add that he has used his endeavors to satisfactorily ventilate the faces of the different districts. Mr. Routledge has informed me that it is his intention, this winter, to build a new and higher cupola in place of the present one. Also, that he intends driving to the dip from the east slope to gain a new lift. The coal mined here this season was chiefly taken from the French, or east slope, and a portion which was taken out of south slant of east slope. A few pillars were taken out of No. 4 north landing on main slope. Last winter a shaft was sunk from the Reserve to the Emery seam for the purpose of ventilating the Emery Works.

## CALEDONIA.

This mine was inspected by me eleven times. I found this mine in good condition. The slants were driven 300 feet further to the dip and a new lift gained, levels extended east and west, and boards broken off them. This section of the mine showed a good deal of gas, but great care and good ventilation render it harmless. A large portion of the coal shipped was taken from the dip slants, some from the pillars to the rise on the east side, and the remainder from the west side. The roof coal has been taken down where it was tender along the main road on east side, and new booms and timber put up there in order to make it safe.

## LITTLE GLACE BAY.

I inspected this mine nine times during the past year. The work was not brisk the past season. I found the works carried on in a very satisfactory condition. The air much better than in 1885. It has been checked and sent closer to the face of the boards. There has also been a great deal of timbering done and stone blocking built up along the main roads for the purpose of safety. The roof in this part of the mine is very bad and requires great attention, especially as the works extend towards the rise. The boiler shed has been completed on the surface and three more boilers placed therein, making a total of six boilers. This is one of the best boiler sheds in this County, being built of an excellent quality of sand stone, quarried below high water mark on the sea shore.

## ONTARIO.

This colliery was visited by me nine times. On my visit in June I found the air very thick at the face of the workings, and on examination found the cause to be that the air-way that was below the level was being closed up by the water raising from the dip. I

suggested that the door be taken down in the level or horse road, and stop the front of the rooms, and put up doors at intervals to admit the coal to come out. As soon as practicable this was attended to and the air allowed to go in to the face of the levels and return through the rooms to the furnace. This gave better satisfaction. The coal raised from this mine was all mined above this level on the south side of the slope. The timbering in the boards was fairly satisfactory. A great number of the props and booms in the slope had to be replaced owing to decay, a little more timbering would not be amiss in order to make it safe.

#### BLOCK HOUSE.

About the 24th of March the roof broke away below the brook, and the pit would have been drowned out, but for the energy of the officials and workmen. The opening was stopped, and made tight by them, and the pit saved. In the first of the season a small quantity of coal was shipped. About the 20th of August the plant was sold. In the later part of the season a few more cargoes of coal was shipped. In all I visited this colliery thirty times, chiefly for the purpose of looking after the extraction of the plant which was removed and stored satisfactorily. The works are now filling up with water, and in a very short time will be filled to tide level.

#### GOWRIE.

I visited this colliery fourteen times. In all my inspections at this mine I found the mines regulation act strictly fulfilled. The timbering all through the mine is kept in the best condition. The air is good. What chiefly adds to its purity is that very little powder is used in blasting the coal. The quantity of air has been considerably increased by a new and separate inlet through the east levels to the dip workings. The roads and ropes are in good condition and everything appears to work well. A large quantity of the coal shipped was taken from the new lift in the dip workings. The roof stone is much harder than to the rise, and the splint above the coal is very much thinner. The manager says the coal has improved in its quality.

#### CHIMNEY CORNER.

I paid an official visit to this mine on the 15th of July. I was informed that the work had started there on a small scale on the 2nd of May, and from that date until the date of my visit they had shipped three small cargoes. A vessel was being loaded while I was there, and five miners were at work. I did not consider one or two places in the main entry safe, owing to a great pressure on the timbers, which were on the point of breaking, this I brought to the notice of a man named Kenneth McIntosh, who was in charge, he promised to have it attended to at once and secured. A new outlet was driven for ventilation from the face of the outside board to the surface, and crop of coal. There is no furnace at this mine.

The air was very dull when measured, owing to the day being very calm and hot, 500 feet is all the anemometer showed. I did not see Mr. Evans the proprietor of the mines. I was informed that he had gone to England.

I also visited Broad Cove on the 15th of July. At the mine there has not been anything done for a number of years. The timbering in levels and mouth of slope were decayed, and a part of the roof has fallen in. There was a small opening in the side of the bank towards the crops of the coal, where some had lately been taken out for home consumption. Mr. Hugh Ross, who had taken charge of the place, was in Halifax during my visit.

I also beg to enclose tables showing amounts of air measured on my visits, accidents and cause, pumps, etc. In conclusion I must say that the Mines Regulation Act has been very fairly observed through the mines here.

I remain your obedient servant,

PATRICK NEVILLE,  
*Deputy Inspector of Mines.*

Report of No. of cubic feet of Air measured in Mines in Cape Breton year, 1886.

COLLIERIES.	January.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.
Sydney Mines.....	.....	53,500	50,540	56,590	57,180	59,800	60,000	53,680	67,920	68,140	68,810	64,140
Victoria.....	30,700	25,600	22,200	30,600	31,000	.....	22,260	22,260	29,230	30,080	26,460	26,460
Barrasois.....	4,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lingan.....	.....	.....	27,500	27,900	27,000	23,000	24,700	24,000	24,350	25,000	.....	.....
Old Bridgeport.....	.....	3,800	3,000	2,000	3,000	2,000	2,800	.....	3,500	7,700	9,550	14,800
International.....	10,000	10,000	15,000	24,000	29,400	36,400	32,000	40,240	35,940	40,380	10,500	.....
Reserve.....	20,000	15,000	20,000	28,680	31,000	20,760	26,460	30,180	27,150	26,700	33,000	20,000
Caledonia.....	.....	10,000	12,000	33,000	36,540	35,000	36,140	38,580	38,720	37,560	37,600	32,000
Little Glace Bay.....	9,800	.....	.....	15,500	21,150	20,200	15,000	20,000	18,720	.....	23,590	20,000
Ontario.....	.....	.....	.....	.....	6,000	4,550	4,700	5,000	4,000	6,000	5,000	14,800
Block House.....	.....	.....	15,000	18,000	20,000	.....	.....	10,000	.....	10,000	9,500	4,500
Gowrie.....	.....	13,000	20,000	25,000	40,000	40,000	39,500	41,500	32,460	38,000	42,000	46,660
Chimney Corner.....	.....	.....	.....	.....	.....	.....	500	.....	.....	.....	.....	.....

*Report of Accidents in Mines in Cape Breton for the year 1886.*

Date.	Name of Mine.	Name.	Occupation.	Remarks.
Feb. 23 . . .	Sydney Mines.	John McNeil . . . . .	Miner . . . .	Burned by powder explosion from can while loading.
"	"	Michael McNeil . . . .	"	" " " "
March 5 . . .	Victoria . . . . .	Michael Gardiner . .	"	Slightly burned from gas.
" 18 . . .	Sydney Mines.	Alex. Corwill . . . . .	Overman .	"
" 29 . . .	Gowrie . . . . .	Chas. Carmichael . .	Machinist .	Arm broken by fall from scaffolding at pit head on surface.
April 17 . . .	International . .	Edmund Gcuthow . .	Miner . . . .	Ankle bone broken by piece of coal rolling from junk on him.
May 8 . . . .	Little Glace Bay	Rodk. McDonald . . .	Driver . . . .	Bone broken in wrist between two tubs.
" 10 . . . .	Reserve . . . . .	Thomas Henessy . .	Miner . . . .	Arm broken by fall of coal from face. Arm amputated.
" 11 . . . .	Sydney Mines.	George Kay . . . . .	Overman .	Ribs broken between tubs on incline plane.
" 17 . . . .	Reserve . . . . .	John Corbett . . . . .	Miner . . . .	Leg broken by fall of coal from roof.
" 20 . . . .	Gowrie . . . . .	Malcom McKinnon .	"	Ribs broken by fall of coal from face.
" 21 . . . .	"	Neil Lamond . . . . .	"	Leg broken by fall of stone pot from roof.
" . . . .	"	Daniel McKeagan . .	"	Body bruised by " "
" 31 . . . .	Sydney Mines.	Matthew Corkery . .	Labourer .	Burned slightly by gas from roof.
" . . . .	"	Alex. McGowen . . . .	Miner . . . .	Dropped dead at face of his board from heart disease.
July 11 . . .	Caledonia . . . . .	Charles McGregor . .	"	Bruised from fall of coal from roof.
Oct. 19 . . .	Sydney Mines.	Daniel Morrisson . .	Screen Boy	Killed by rope breaking; tub running back on him.



Figures relating to Machinery used in freeing Cape Breton Mines from Water during the year 1886.

COLLIERIES.	Number of Pumps.	Name and Style of Pump.	Steam Cylind'r diam. inch.	Water Plung'r diam. inch.	Length of Stroke.	Strokes per Minute.	Length of water-pipe.	Length of steam-pipe.	Steam pres- sure at Bank.	Steam pres- sure at pump.	Vertical Lift.	Gallons water per day.	Tons water per hour.	Tons of Coal raised dur- ing 1886.	REMARKS.
Sydney Mines (Queen) ..	1	Made to order.	30	8	48 in.	17	360 ft.	430 ft.	27 lbs.	.....	360 ft.	172,620	261,278	139,646	} For 5 ms. } of year.
do. (New Winn'gs)	2	do.	62	20	84 "	4 1/2	720 "	.....	40 "	.....	720 "	139,863	227,901		
Victoria .....	1	Elliot.	18	7	44 "	14	590 "	890 "	40 "	37 lbs.	305 "	142,380	232,003	50,156	
Lingan .....	3	do.	18	7	48 "	22	350 "	1340 "	30 "	26 "	80 "	80,124	131,056	17,688	
do. ....	.....	do.	15	5	18 "	50	530 "	2048 "	30 "	24 "	116 "				
do. (Driven by frict'n) ..	.....	Made to order.	....	3	9 "	....	700 "	.....	.....	.....	150 "	.....	.....	.....	
International .....	2	Cameron.	16	6	30 "	30	.....	1905 "	45 "	20 "	.....	.....	.....	118,129	
do. ....	.....	do.	12	5	12 "	60	3547 "	1592 "	45 "	20 "	185 "	64,000	117,885		
Reserve .....	2	do.	12	7	24 "	60	.....	2080 "	50 "	35 "	.....	115,984	334,090	81,788	
do. ....	.....	do.	14	9	18 "	50	3037 "	1486 "	50 "	35 "	283 "	12,450			
Caledonia (two setts) ..	2	Lifting.	....	8	48 "	12	123 "	.....	30 "	.....	123 "	86,400	170,785	72,810	
do. ....	.....	do.	....	8	48 "	12	60 "	.....	30 "	.....	60 "	.....	.....	.....	
Little Glace Bay .....	3	Cameron.	8	8	30 "	40	310 "	340 "	.....	.....	260 "	205,834	334,678	33,382	
do. ....	.....	Lifting.	6	6	48 "	10	255 "	.....	.....	.....	255 "				
do. ....	.....	do.	6	6	48 "	10	255 "	.....	.....	.....	255 "	.....	.....	.....	
Block House .....	3	Knowles.	18	9	24 "	50	.....	.....	.....	.....	.....	648,720	268,457	5,053	
do. ....	.....	Built to order.	12	7	12 "	58	.....	.....	.....	.....	.....	139,984			
do. ....	.....	do.	12	7	12 "	58	1155 "	1700 "	.....	.....	115 "	139,984			
Gowrie .....	3	Knowles spec'l	20	10	48 "	20	254 "	244 "	43 "	35 "	215 "	328,265	535,252	95,307	
do. Lifting .....	.....	Built to order.	....	10	36 "	36	110 "	.....	.....	.....	110 "				
do. ....	.....	do.	....	10	36 "	36	110 "	.....	.....	.....	110 "				

} For 5 ms.  
} of year.



LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al .....	Tatamagouche .....	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others .....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River.....	1
IRON.			
PICTOU COUNTY.			
43	Hudson, James.....	East River.....	1
44	Hudson, James.....	" .....	1

Total area under lease .....19½ square miles.

## LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lease.	District.	Area, Sq. Miles.
	IRON.—(CONTINUED).		
	CAPE BRETON COUNTY.		
86	Brookman, S., et al .....	N. Side East Bay .....	1
91	Brookman, S. L. ....	East Bay .....	1
93	Brookman, S., et al .....	" " .....	1
102	C. L. Ingram .....	" " .....	1
103	A. McKenzie, et al .....	" " .....	1
92	Matheson, D., et al .....	" " .....	1
84	Protheroe, Pryse .....	Cow Bay .....	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co. ....	Whycocomagh .....	1

## LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	McKinnon, et al .....	ANTIGONISH CO.	3			
		CUMBERLAND CO.				
21	Bligh, James, et al .....	.....	1			
47	Boston, C. M. Co .....	.....	1	.....		
25	Campbell, Alex., et al .....	.....	1			
	" .....	.....	2			
32, 34	" .....	.....	4			
35, 48, 49, 50	Campbell, John .....	.....	8			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, W. ....	.....	1			
54	Cumberland C. M. Co .....	Chignecto .....	4	Working.	Jas. Baird .....	Maccan.
12	} Cumberl'd R'y & C'l Co.	Springhill .....	9	"	R. G. Leckie ... }	Springhill.
6, 7, 8, 44, 52, 55	Joggins C. M. Association ..	Joggins .....	2	"	W. Hall .....	Joggins.
	Joggins C. M. Co .....	Cumberland .....	2		P. McNaughton ..	
5	Lawson C. M. Co .....	Maccan .....	1			
51, 53	Milner, Christopher .....	.....	2			
6	Seaman, Gilbert .....	.....	1	Working.	M. Dunlop .....	River Hebert
24	Shannon, S. L. ....	.....	2			
36, 39	Shannon, S. L. (in trust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.) ..	.....	5		J. S. Hickman ...	Amherst.
9	Boston Coal Mining Co .....	.....	2			

26, 27	Wright, John V .....		8				
		PICTOU CO:	53				
1	Acadia Coal Co.....	Fraser .....	1	Working.	{ H. S. Poole .....	Stellarton.	
3	" .....	Acadia .....	1	"	{ J. Maxwell .....	Westville.	
42	" .....	Pictou.....	4	.....	{ T. Turnbull ...	Vale Colliery.	
23	" .....	Vale .....	3	Working.	{		
	" .....	.....	4		John Douglas..	Stellarton.	
10	Acadia Coal Co.....	Albion .....	1	Working.			
11	Gray, B. G., et al.....	.....	1				
13, 14	Halliburton, R. G., et al.....	.....	2	Working.	Robt. Simpson....	Westville.	
12	Intercolonial Coal Co.....	.....	1				
6	" .....	Drummond .....	1				
24	Kirby, Lewis R.....	.....	1				
	Richey, M. H.....	.....	1				
		CAPE BRETON.	20				
3	Archibald, Blowers.....	Gowrie .....	1	Working.	{ Archibald & Co.	North Sydney	
2	Archibald, Thomas D.....	" .....	1		{ Chas. Archibald.	Cow Bay.	
5, 28	Blockhouse Mining Co.....	Blockhouse .....	2	Working.	R. Belloni.....	"	
29	" (sea area)...	.....	1				
15	Caledonia, C. & R. Co .....	Caledonia.....	1	Working.	David McKeen...	Glace Bay.	
31	" (sea area)...	.....	1				
30	International Coal Co .....	.....	1		P. Johnstone .....	Bridgeport.	

## LIST OF COAL LEASES—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
8, 9	Halifax Coal & Iron Co....	Ontario .....	1½	Working.	<i>Jno. Sutherland</i> .	Pt. Caledonia.
27	General Mining Association	Bridgeport .....	2	Working.	{ <i>Rich. H. Brown</i> .	Sydney Mines
	" " (sea area)...	Sydney .....	18	Working.	{ <i>Cunard &amp; Morrow</i>	Halifax.
	" " (sea area)...	" .....	4		{ <i>H. Mitchell</i> .....	Bridgeport.
38, 39	Low Point, Barasois, and...	Lingan .....	13	Working	<i>Donald Lynk</i> ....	Low Point.
10, 21	Lingan Mining Co. (Ltd.)...	" .....	9			
	Gibson, John, et al.....	" .....	2			
4, 12, 16	Glace Bay Mining Co.....	Glace Bay .....	3	Working	{ <i>E. P. Archbold</i> .	Halifax.
6, 13, 18, 19	International Coal Co., Lt'd.	International .....	4	"	{ <i>Chas. Rigby</i> .....	Lt. Glace Bay.
66	Merchants' Bank of Canada	Gardener .....	2		<i>P. Johnstone</i> .....	Bridgeport.
52, 53	McLeod, Hugh .....	" .....	2			
40, 41, 42	Ross, H. E., et al.....	" .....	3			
79	Ross, W. J., et al (sea area)	" .....	1			
32	Sword, Wm. (sea area)...	" .....	3			
23, 25, 70	Sydney & Louisburg Coal					
14, 24	and R. R. Co., Lt'd.....	Schooner Pond ..				
49	" " " " " "	Reserve .....	10	Working.	{ <i>F. C. Kimber</i> ..	Sydney.
64, 65, 68	" " " " " "	Lorway .....			{ <i>W. Routledge</i> ..	Reserve Mines
69	" " " " " "	Emery .....				
54 to 63	Sydney C. M. Co. (sea areas)	" .....	10			
67	Weatherbe & Kirby .....	" .....	1			
78	Weatherbe, R. L. (sea area)	" .....	5			
96, 97, 98, 99, 100	Low Point, Barasois and	" .....				

	Lingan Mining Co., Ltd. ( <i>sea areas</i> )	.....	5	Working.	D. Lynk .....	Low Point.
	"	.....	2			
		.....	<u>178½</u>			
		INVERNESS CO.				
8	Evans, Thomas .....	Chimney Corner.	1		T. Evans.....	Chimney Cor.
9	Evans, Thomas ( <i>sea area</i> ).	.....	1			
7, 12	Inverness C. I. & R. C. ....	.....	2		Alex. Wright....	Moncton.
13	McGregor, J. D. ....	Port Hood .....	3			
4	Richey, M. H., et al .....	.....	1			
11	Ross, W. J. ....	Broad Cove .....	1			
6	Ross, H. E., et al ( <i>sea area</i> )	.....	1			
14, 15	Smyth, Peter .....	.....	2			
10	Tromaine, E. D. ( <i>sea area</i> ).	.....	1			
		VICTORIA CO.	<u>13</u>			
2	Kenny, T. E. ....	New Campbellton	3			
3, 4, 5	Ross, William .....	Black Rock .....	5			
		.....	<u>8</u>			
Total area under lease .....			224 square miles.			

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		POTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter .....	92,557	86,006	71,504	60,298	43,694	6,567	195	183	207,950	153,054
2nd Quarter .....	100,369	94,938	110,384	92,822	194,880	168,580	.....	.....	405,633	356,340
3rd Quarter .....	123,178	111,536	130,099	123,519	281,761	292,599	.....	.....	535,038	527,654
4th Quarter .....	132,517	123,786	102,818	92,387	118,655	120,445	.....	.....	353,990	336,618
Total .....	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885 .....	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884 .....	279,964	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883 .....	247,861	222,347	505,626	461,809	668,293	612,614	753	753	1,422,553	1,297,523

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOR.			CAPE BRETON.			Other Counties.			TOTALS.			Grand Total.
	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	Round.	Black.	Run of Mine.	
Nova Scotia Land Sales	27,695	50,176	24,682	95,368	64,625	....	3,354	5,300	....	183	....	....	126,600	120,101	24,683	271,384
Sea borne.....	427	869	36	35,688	6,835	....	123,481	12,360	9,157	....	....	....	159,596	20,064	9,193	188,853
Nova Scotia, total ....	28,122	51,045	24,719	131,056	71,460	....	126,835	17,660	9,157	183	....	....	286,196	140,165	33,876	460,237
New Brunswick .....	27,458	23,232	67,398	23,463	3,053	....	25,909	230	145	....	....	....	81,830	26,545	67,543	175,918
Newfoundland .....	.....	.....	.....	453	.....	....	69,418	1,600	....	....	....	....	69,876	1,600	....	71,476
P. E. Island .....	.....	.....	.....	13,649	21,318	....	8,886	5,315	....	....	....	....	22,535	26,633	....	49,168
Quebec .....	9,501	16,575	162,859	92,600	2,399	....	187,911	28,413	38,004	....	....	....	290,012	47,887	200,863	538,762
West Indies .....	5,021	336	.....	.....	.....	....	10,691	673	....	....	....	....	15,712	1,009	.....	16,721
United States .....	.....	.....	.....	2,160	1,880	....	19,967	23,599	3,040	....	....	....	22,127	35,479	3,040	60,646
Other Countries .....	.....	.....	.....	.....	.....	....	718	20	....	....	....	....	718	20	.....	738
Total .....	70,102	91,188	254,976	268,386	100,640	....	450,335	87,510	50,346	183	....	....	789,006	279,338	305,322	1,373,666
1885 .....	31,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	....	....	....	778,378	247,676	228,456	1,254,510
1884 .....	155,999	102,406	.....	330,309	138,872	....	459,210	70,845	.....	....	....	....	945,518	316,132	.....	1,261,650
1883 .....	152,453	69,894	.....	319,859	141,950	....	543,419	69,195	.....	687	66	....	1,016,413	281,105	.....	1,297,528



## COAL—SALES.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1886.	Year 1885.
Nova Scotia.						
Land Sales..	64,084	64,928	63,743	78,629	271,384	255,808
Sea borne...	5,014	38,405	84,231	61,203	188,853	188,844
N. S.—Total ..	69,098	103,333	147,974	139,832	460,237	454,652
N. Brunswick .	30,573	34,869	57,426	53,050	175,918	148,634
Newfoundland.	1,223	12,615	35,780	21,858	71,476	74,322
P. E. Island ...	.....	10,094	23,737	15,337	49,168	52,770
Quebec. ....	51,288	140,678	242,422	95,374	538,762	493,917
West Indies ..	410	6,778	1,177	2,999	11,364	5,732
United States .	.....	38,697	19,138	8,168	66,003	34,483
Other countries	462	276	.....	.....	738	.....
Total....	153,054	356,340	527,654	336,618	1,373,666	1,254,510
1885..	125,351	309,513	510,787	308,859	1,254,510	
1884..	138,303	307,915	486,601	328,821	1,261,650	

## COAL.—GENERAL STATEMENT.

1886.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	207,950	153,054	37,272
2nd " .....	405,633	356,340	85,651
3rd " .....	535,038	527,654	32,725
4th " .....	353,990	336,618	36,773
Total.....	1,502,611	1,373,666	142,421
1885 .....	1,352,205	1,254,510	127,624
1884 .....	1,389,295	1,261,650	116,769
1883 .....	1,422,553	1,297,523	111,949

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1886.

COLLIERIES.	SEAMS.	Produce.	SALES.				COLLIERY CONSUMPTION.		
			Round.	Slack.	Run of Mine	Total.	Engines.	Workmen.	Per Cent.
CUMBERLAND Co.	North .....	9,148	5,292	1,435	800	7,527	1,402	195	17
	Joggins .....	22,243	15,666	3,131	.....	18,797	2,313	534	13
	Lawrence.....	50	.....	.....	.....	.....	.....	.....	.....
	Spring Hill.....	416,769	48,750	86,550	254,176	389,476	17,178	4,376	5
	Scotia .....	411	394	72	.....	466	.....	5	.....
Pictou Co.	Acadia .....	98,891	56,139	36,393	.....	92,532	4,863	1,950	7
	Third and McGregor.....	77,807	38,088	22,408	.....	60,496	13,895	3,400	22
	McBean and Six Feet .....	128,539	93,977	27,802	.....	121,779	5,797	2,333	17
	Acadia .....	108,498	79,702	13,907	.....	93,609	17,533	1,516	6
	.....	1,070	480	130	.....	610	240	125	.....
CAPE BRETON Co.	Lingan .....	87	94	.....	.....	94	.....	24	.....
	Block House .....	5,063	2,913	.....	.....	2,913	1,267	983	.....
	Phelan .....	14,344	11,189	1,330	.....	12,519	230	287	3
	Phelan .....	72,810	49,404	23,644	.....	73,048	1,236	1,091	3
	Sydney .....	1,996	1,530	466	.....	1,996	.....	.....	.....
FRANKLYN	Harbor .....	33,382	26,538	2,535	.....	29,123	3,123	922	12
	Gowrie .....	95,307	71,171	17,774	.....	88,945	3,160	3,410	6
	Harbor .....	118,129	58,393	9,752	38,004	106,149	6,776	2,067	6
	Lingan .....	17,688	12,365	2,548	145	15,058	2,076	1,100	12
	Phalen .....	8,599	8,111	140	.....	8,251	130	168	.....
INVERNESS Co.	Phalen .....	81,733	67,550	15,852	.....	83,402	4,156	4,068	10
	Sydney .....	139,646	110,416	9,533	.....	119,949	15,947	7,891	11
	Victoria .....	50,156	30,611	3,936	12,197	46,744	3,563	1,491	10
	Broad Cove .....	105	100	.....	.....	100	.....	.....	.....
	Ross .....	90	83	.....	.....	83	.....	.....	.....
Total.....		1,502,611	789,006	279,338	305,322	1,373,666	104,935	37,486	.....

COLLIERY CONSTRUCTION ACCOUNT.—1886.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	Total.
CUMBERLAND COUNTY.											
Chignesto .....											
Joggins .....			\$ 150 00								\$ 150 00
Lawrence .....											
Springhill .....		\$ 831 00		\$5616 00	\$2650 00		\$375 00			\$1827 00	11299 00
Scotia .....											
Pictou County.											
Acadia Co. { Acadia .....											
{ Albion .....											
{ Vale .....											
Intercolonial .....			1388 00	\$16 00	181 00			\$ 91 00			1976 00
New Glasgow .....										5000 00	5900 00
CAPE BRETON COUNTY.											
Barrasois .....		332 00									332 00
Blackhouse .....											
Bridgeport .....	\$ 200 00		400 00					125 00			725 00
Caledonia .....		2176 00	554 00								2730 00
Francklyn .....											
Glace Bay .....											
Gowrie .....			1558 00			\$296 00					1854 00
International .....											
Lingan .....			417 00								417 00
Ontario .....			81 00	10 00							91 00
Reserve .....	\$2052 00	1912 00	1545 00		140 00	55 00					5704 00
Sydney .....				1107 00							1107 07
Victoria .....			4440 00	1827 00	185 00		312 00	486 00			7250 00
INVERNESS COUNTY.											
Broad Cove .....		20 00	106 00				24 00				150 00
Ross .....											
	\$2252 00	\$5271 00	\$10639 00	\$8876 00	\$3156 00	\$351 00	\$711 00	\$702 00		\$6827 00	\$38785 00

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31st, 1886.

MINES REPORT.

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COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.			TOTAL.		Average num. per cutter.	Average tons per day per cutter.	Average quan- tity raised per day.	HORSES.		PITS WORKED
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Persons.				Above.	Below.	
CUMBERLAND Co.																			
Chignecto .....	11	3	3	4,308	2	5	1	2,311	...	...	...	...	25	6,619	881	3.7	42	1	218
Joggins .....	29	4	7	8,497	6	20	7	7,635	...	...	...	...	73	16,132	767	4.3	127	2	175
Lawrence .....	...	...	...	...	...	...	...	...	3	1	...	60	4	60	...	...	...	...	...
Springhill .....	412	237	125	199,755	66	129	13	53,028	14	9	...	4,747	1,005	257,530	1,011	4.	1,653	45	252
Scotia .....	7	...	...	255	1	...	...	53	...	...	...	...	8	308	...	...	1	...	53
Pictou Co.																			
Acadia Co.—Acadia.	91	96	28	45,272	18	40	7	17,186	...	...	...	...	280	62,458	1,085	5.	497	5	199
“ Albion.	105	66	37	42,191	55	59	23	34,766	...	...	...	...	345	76,957	741	3.3	347	6	224
“ Vale ..	203	109	20	76,377	35	67	10	27,928	...	...	...	...	444	104,300	633	3.7	756	10	169
Intercolonial .....	128	50	55	49,625	33	50	8	24,459	1	...	...	177	325	74,261	847	3.5	448	17	242
New Glasgow .....	4	1	...	1,590	2	...	...	452	...	...	...	...	7	2,042	250	...	...	...	180
CAPE BRETON Co.																			
Barrasois .....	...	3	...	207	...	2	...	138	...	...	...	...	5	345	...	...	...	...	38
Blockhouse .....	16	1	6	2,356	5	10	2	3,714	...	...	...	...	40	6,070	316	4.5	...	3	70
Bridgeport .....	14	2	2	3,568	2	1	...	1,662	1	...	...	129	24	5,359	1,024	9.9	135	2	106
Caledonia .....	82	6	21	19,203	15	22	10	10,817	10	1	2	2,245	188	32,265	900	5.3	428	15	170
Franklyn .....	4	1	1	974	1	1	...	507	...	...	...	...	8	1,481	499	...	...	1	...
Glace Bay .....	61	6	13	8,158	27	19	3	12,535	...	...	...	...	129	20,693	547	3.8	236	14	141
Gowrie .....	119	13	40	28,600	41	58	20	22,096	1	...	...	75	292	50,771	800	5.9	700	18	135
International .....	150	31	41	16,353	31	47	5	7,068	...	...	...	...	305	23,421	787	4.8	722	34	162
Lingan .....	49	6	15	9,778	3	21	6	5,440	...	...	...	...	100	15,218	400	2.5	114	7	155
Ontario .....	15	2	5	3,398	3	8	2	2,461	...	...	...	...	35	5,859	570	5.	74	3	114
Reserve .....	137	15	40	34,874	16	18	9	9,865	4	1	...	1,100	240	45,839	599	3.4	467	15	175
Sydney .....	213	37	92	67,992	56	80	40	45,037	4	...	...	1,100	522	114,129	650	3.4	723	40	193
Victoria .....	86	20	10	31,325	5	34	8	14,533	...	...	...	...	163	45,858	588	2.	170	3	296
INVERNESS Co.																			
Broad Cove .....	5	3	...	...	2	...	...	9	...	...	...	...	10	104	...	...	1	...	...
Ross .....	3	3	1	60	1	...	...	30	...	...	...	...	8	90	...	...	1	...	30
	1944	615	562	654,811	426	691	176	303,725	38	12	2	9,633	4,585	968,769	...	...	...	...	...

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1869	257,485	\$1 25
1851	116,274	"	1870	168,180	"
1852	87,542	"	1871	165,431	"
1853	120,764	"	1872	154,092	75
1854	139,125	Free	1873	264,760	"
1855	103,222	"	1874	138,335	"
1856	126,152	"	1875	89,746	"
1857	123,335	"	1876	71,634	"
1858	186,743	"	1877	118,216	"
1859	122,720	"	1878	88,495	"
1860	149,289	"	1879	51,641	"
1861	204,457	"	1880	123,423	"
1862	192,612	"	1881	113,728	"
1863	282,775	"	1882	99,302	"
1864	347,594	"	1883	102,755	"
1865	465,194	"	1884	64,515	"
1866	404,252	"	1885	34,483	"
1867	338,492	\$1 25	1886	60,646	"
1868	228,132	"			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

*Nova Scotia Coal Sales, from 1785 to 1886 (inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.							
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177							
1786	2,000		1842	129,708	1,533,798							
1787	10,681		1843	105,161		2,399,829						
1788			1844	108,482			4,927,339					
1789			1845	150,674				7,377,428				
1790			1846	147,506					7,472,542			
1791	2,670		1847	201,650						24,919,113		
1792	2,143	1848	187,643	Total.....								
1793	1,926	1849	174,592								839,981	
1794	4,405	1850	180,084									Total.....
1795	5,320	1851	153,499									
1796	5,249	1852	189,076		Total.....							
1797	6,039	1853	217,416			Total.....						
1798	5,948	1854	234,312				Total.....					
1799	8,947	1855	238,215					Total.....				
1800	8,401	1856	253,492						Total.....			
1801	5,775	1857	294,198							Total.....		
1802	7,769	1858	226,725	Total.....								
1803	6,601	1859	270,293								Total.....	
1804	5,976	1860	322,593									Total.....
1805	10,130	1861	326,429									
1806	4,938	1862	395,637		Total.....							
1807	5,119	1863	429,351			Total.....						
1808	6,616	1864	576,935				Total.....					
1809	8,919	1865	635,586					Total.....				
1810	8,609	1866	558,520						Total.....			
1811	8,516	1867	471,185							Total.....		
1812	9,570	1868	453,624	Total.....								
1813	9,744	1869	511,795								Total.....	
1814	9,866	1870	568,277									Total.....
1815	9,336	1871	596,418									
1816	8,619	1872	785,914		Total.....							
1817	9,284	1873	881,106			Total.....						
1818	7,920	1874	749,127				Total.....					
1819	8,692	1875	706,795					Total.....				
1820	9,980	1876	634,207						Total.....			
1821	11,388	1877	697,065							Total.....		
1822	7,512	1878	693,511	Total.....								
1823	27,000	1879	688,628								Total.....	
1824		1880	954,659									Total.....
1825		1881	1,035,014									
1826		12,600	1882		1,250,179							
1827	12,149	1883	1,297,523		Total.....							
1828	20,967	1884	1,261,650			Total.....						
1829	21,935	1885	1,254,510				Total.....					
1830	27,269	1886	1,373,666					Total.....				
1831	37,170	Total.....							Total.....			
1832	50,396	Total.....		Total.....								
1833	64,743	Total.....								Total.....		
1834	50,813	Total.....									Total.....	
1835	56,434	Total.....										Total.....
1836	107,593	Total.....										
1837	118,942	Total.....			Total.....							
1838	106,730	Total.....				Total.....						
1839	145,962	Total.....					Total.....					
1840	101,198	Total.....						Total.....				

SUMMARY.

1785 to 1790 .....	14,349	1831 to 1840 .....	839,981
1791 to 1800 .....	51,048	1841 to 1850 .....	1,533,798
1801 to 1810 .....	70,452	1851 to 1860 .....	2,399,829
1811 to 1820 .....	91,527	1861 to 1870 .....	4,927,339
1821 to 1830 .....	140,820	1871 to 1880 .....	7,377,428

GOLD GENERAL STATEMENT FOR THE YEAR 1886.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1886.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Caribou .....	3	15394	3	2	1	3087	0	14 10	2	1 0	2233	17 16
Darr's Hill .....	1	27221	1	...	1	11628	0	11 4	1	6 0	6509	0 0
Montagu .....	1	1434	2	2	...	77	1	2 18	9	1 0	87	14 0
Oldham .....	3	13043	2	1	1	1026	2	2 20	12	1 0	2199	3 23
Renfrew .....	1	3679	2	...	2	428	0	18 15	1	0 0	233	17 0
Sherbrooke .....	6	17669	7	3	4	2850	0	9 10	3	18 12	1341	3 9
Stormont .....	2	3142	2	2	...	429	1	0 6	1	18 0	435	0 0
Tangier .....	2	6399	2	2	...	936	0	17 17	1	7 0	360	19 14
Uniacke .....	2	3146	3	3	...	1263	0	5 2	2	0 0	320	17 3
Waverly .....	1	2736	1	1	...	508	0	12 22	1	19 0	329	2 0
Unproclaimed, &c. ....	5	35017	10	7	3	6778	1	7 0	17	10 0	9312	0 22
Total .....	27	128880	35	23	12	29010	0	16 2	17	10 0	23363	5 15

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.						DARR'S HILL.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	2	1333	53	213	75	5	2	1	.....	..	947	1297	..	..
February .....	2	1172	46	274	149	13	20	1	.....	..	840	612	..	..
March .....	3	1633	65	.....	1	3	15	1	.....	..	1147	1045	..	..
April .....	2	1144	46	295	160	7	..	1	3110	124	1065	730	..	..
May .....	4	1228	49	260	480	10	..	1	3060	122	985	373	..	..
June.....	3	1016	40	247	181	15	1	1	2880	115	983	562	..	..
July.....	3	1281	50	177	181	12	6	1	3017	121	1061	342	..	..
August.....	5	1260	50	345	239	13	6	1	3080	123	803	383	..	..
September.....	2	1075	43	503	291	4	..	1	2998	120	873	269	..	..
October .....	2	1258	50	136	76	16	..	1	3116	124	1043	296	..	..
November .....	4	1461	58	283	109	..	7	1	3000	120	955	297	..	..
December .....	6	1533	61	354	286	17	7	1	2960	119	926	303	..	..
Totals.....	3	15394	.....	3087	2233	17	16	3	27221	.....	11628	6509	..	..



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	MONTAGU.					OLDHAM.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	.....	.....	.....	.....	..	..	..	2	866	34	56	25	2	9
February.....	.....	.....	.....	.....	..	..	..	2	882	35	70	155	1	..
March.....	.....	.....	.....	.....	..	..	..	2	1166	47	94	75	16	..
April.....	1	64	.....	.....	..	..	..	2	973	39	93	315	3	4
May.....	1	143	6	3	3	18	..	4	1353	54	98	401	14	5
June.....	2	263	10	8	14	9	..	4	1227	49	96	174	6	12
July.....	.....	.....	.....	.....	..	..	..	3	970	38	144	403	13	17
August.....	1	10	.....	.....	..	..	..	4	1193	47	45	46	16	..
September.....	1	179	7	.....	..	..	..	3	1034	41	65	105	13	..
October.....	1	308	12	.....	..	..	..	4	1143	45	126	209	10	..
November.....	1	342	13	21	61	2	..	3	1118	45	25	61	2	..
December.....	1	125	5	45	8	5	..	3	1118	45	119	225	6	..
Totals.....	1	1434	.....	77	87	14	..	3	13043	.....	1026	2199	3	23

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	RENFREW.						SHERBROOKE.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January .....	1	561	22	145	68	6	..	5	1456	58	240	98	2	7
February .....	1	426	17	121	58	7	..	5	1080	43	99	72	17	0
March .....	1	510	20	92	92	12	..	6	1525	61	277	278	7	4
April .....	1	236	9	10	..	12	..	6	1040	43	242	96	4	..
May .....	1	263	10	.....	..	..	..	6	1430	57	171	63	17	10
June .....	1	212	8	10	..	7	..	8	2015	81	131	70	16	12
July .....	1	216	8	22	7	5	..	8	1995	80	211	156	6	..
August .....	1	239	9	28	6	8	..	8	1560	62	392	166	6	..
September .....	1	256	10	.....	..	..	..	7	1612	68	54	107	2	..
October .....	1	228	9	.....	..	..	..	6	1560	62	224	49	5	..
November .....	1	231	9	.....	..	..	..	6	1586	63	390	106	6	..
December .....	1	301	12	.....	..	..	..	5	810	32	219	75	14	..
Totals .....	1	3679	.....	428	233	17	..	6	17669	.....	2850	1341	3	9

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	STORMONT.					TANGIER.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gra.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gra.
January .....	1	334	13	37	67	12	..	2	700	28	...	...	..	..
February .....	1	272	11	43	83	11	..	2	841	33	77	43	10	..
March .....	2	700	28	10	14	4	..	3	879	35	259	89	13	12
April .....	2	493	20	60	68	16	12	3	797	32	20	6	19	..
May .....	1	267	10	21	27	3	12	2	597	24	332	138	12	..
June .....	1	250	10	25	17	19	..	3	858	34	144	43	..	..
July .....	1	46	2	1	..	15	12	2	374	15	10	13	6	..
August .....	1	84	3	1	1	2	..	3	522	22	12	6	..	..
September .....	1	31	2	80	72	8	12	2	506	29	22	7	10	..
October .....	2	231	9	71	35	8	..	1	150	6	...	...	..	..
November .....	2	295	12	23	18	10	..	1	75	3	49	6	14	2
December .....	2	138	5	57	27	10	..	1	100	4	11	5	15	..
Totals .....	2	3142	...	429	435	..	..	2	6399	...	936	360	19	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNIACKE.						WAVERLY.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	3	420	17	166	55	14	6	1	504	20	45	24	18	..
February.....	2	375	15	55	6	11	..	1	557	22	43	28	3	..
March.....	2	344	14	33	20	8	..	1	578	23	43	32	14	..
April.....	2	320	13	124	36	13	..	..	.....	.....	39	37	10	..
May.....	2	180	7	109	30	19	6	..	.....	.....	52	43	16	..
June.....	2	119	5	87	28	18	..	..	.....	.....	57	26	8	..
July.....	1	30	1	20	3	9	..	1	350	14	76	38	8	..
August.....	1	50	2	110	24	12	..	1	240	10	25	15	8	..
September.....	1	40	2	156	37	4	..	1	92	4	8	5	2	..
October.....	1	389	16	78	12	17	..	1	140	5	25	23	13	..
November.....	1	592	24	178	34	10	..	1	130	5	36	19	2	..
December.....	1	287	12	147	29	1	15	1	145	5	59	34	..	..
Totals.....	2	3146	.....	1263	320	17	3	1	2736	.....	508	329	2	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNPROCLAIMED.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Grs.
January .....	2	274	11	140	222	..
February .....	2	374	18	168	453	..
March .....	2	516	20	475	746	..
April .....	3	811	32	305	426	..
May .....	4	614	24	414	908	..
June .....	7	1718	69	548	852	5
July .....	6	5710	228	483	850	8
August .....	5	5887	231	445	602	..
September .....	5	5992	239	1256	1725	15
October .....	6	4054	162	797	1056	3
November .....	6	4455	178	923	781	15
December .....	8	4612	184	824	686	..
Total .....	5	35017	.....	6778	9112	22

# GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
Total.	412542	9	4	553823	.....			3766,494		

## INTERCOLONIAL RAILWAY.

*STATEMENT showing number of tons of Coal received at the following Stations from Mines in Nova Scotia, for Year ending 31st December, 1886.*

Stations.	No. Tons.	Stations,	No. Tons.
Halifax . . . . .	38424	Penobsquis . . . . .	2137
Dartmouth . . . . .	6948	Sussex . . . . .	403
Bedford . . . . .	574	Apohaqui . . . . .	23
Windsor Junction . . . .	4136	Norton . . . . .	12
Wellington . . . . .	68	Passekeag . . . . .	6
Enfield . . . . .	454	Hampton . . . . .	408
Elmsdale . . . . .	173	Rothsay . . . . .	62
Milford . . . . .	60	Coldbrook . . . . .	6709
Shubenacadie . . . . .	240	St. John . . . . .	38618
Stewiacke . . . . .	273	Berry's Mills . . . . .	12
Brookfield . . . . .	128	Weldford . . . . .	13
Truro . . . . .	6900	Kent Junction . . . . .	386
Valley . . . . .	18	Rogersville . . . . .	6
West River . . . . .	36	Chatham Junction . . .	552
Glengarry . . . . .	24	Derby . . . . .	6
Hopewell . . . . .	1393	Newcastle . . . . .	53
New Glasgow . . . . .	13391	Bathurst . . . . .	605
Pictou Landing . . . . .	82081	Petit Roche . . . . .	18
Belmont . . . . .	66	Jaquet River . . . . .	12
Debert . . . . .	6	New Mills . . . . .	12
East Mines . . . . .	18	Charlo . . . . .	6
Londonderry . . . . .	66608	Dalhousie Junction . . .	50
Wentworth . . . . .	30	Campbellton . . . . .	102
Greenville . . . . .	24	Metapedia . . . . .	106
Thomson . . . . .	6	Cedar Hall . . . . .	6
Oxford . . . . .	424	Little Metis . . . . .	6
River Phillip . . . . .	6	St. Octave . . . . .	6
Athol . . . . .	6	Ste. Flavie . . . . .	6
Maccan . . . . .	6	Rimouski . . . . .	31
Nappan . . . . .	12	Trois Pistoles . . . . .	45
Amherst . . . . .	3969	St. Arsene . . . . .	12
Aulac . . . . .	305	Riviere du Loup . . . .	32
Sackville . . . . .	1877	St. Roche . . . . .	13
Dorchester . . . . .	1044	St. Henri . . . . .	11419
Memramcook . . . . .	309	Point Levis . . . . .	17372
Shediac . . . . .	235	Chaudiere (Local) . . . .	80989
Point du Chene . . . . .	42	Do. (West) . . . . .	65732
Moncton . . . . .	10239	Points E. Ext. Railway .	607
Salisbury . . . . .	1108		
Petitcodiac . . . . .	289	Total . . . . .	468543

**From the following Stations :**

<b>STATIONS.</b>	<b>No. Tons.</b>
New Glasgow .....	27895
Stellarton .....	128577
Hopewell .....	666
Drummond .....	29032
Springhill .....	276549
Maccan .....	5824
<b>Total .....</b>	<b>468543</b>

**MONCTON, N. B., February 10th, 1887.**



MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

IRON ORE MINING.

Londonderry .....Tons. 44,388

AVERAGE FORCE EMPLOYED.

Skilled workmen:		
	No. of men.	Days' Labor.
Under ground.....	70	18,932
Above ground.....	14	4,296
Unskilled workmen:		
Above ground.....	30	8,024
Under ground.....	52	12,574
	166	.....

LIMESTONE.

St. Peters .....	Tons.	5,441
Pugwash .....	"	148
Londonderry (ankerite) .....	"	947
Brookfield .....	"	13,729
Total .....		20,265

BARYTES.

Henderson & Potts, } Brookfield. }	..... Tons.	230
Average force employed daily.....		3

GRINDSTONES, ETC.

Lower Cove, Cumberland Co., Messrs. A. Seaman & Co }	.....Tons.	1,600	Value.....\$22,400
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## MOULDING SAND.

Windsor.....	Tons.	200	Value.....\$	200
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## MANGANESE.

*Tenny Cape.....	Tons.	171	Value.....\$	12,066
*Cheverie.....	"	6	" .....	358
Cornwallis.....	"	250	" .....	
East Onslow .....	"	20	" .....	1,800
Halifax.....	"	18½	" .....	590

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## †ANTIMONY.

Rawdon .....	Tons.	645	Value.....\$	26,370
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Tenny Cape out-put .....	Tons.	200
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## †GYPSUM.

Windsor.....	Tons.	96,087	Value.....\$	96,119
Cheverie .....	"	23,272	" .....	17,509
Walton.....				
St. Ann's, C. B.....	"	4,300		
Lennox Passage .....				
Halifax .....	"	94	" .....	492
Total .....	"	123,753		

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## BUILDING STONE.

Antigonish .....	Tons.	15	Value.....	\$60
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Amounts exported.

## HALIFAX.

*Export Statement ; the Produce of the Mine from the Port of Halifax  
for the Year Ending 31st December, 1886.*

Article.	Quantity.	Value.
Coal .....Tons.	23,397	\$74,027
Gold .....		373,857
Gypsum.....Tons.	94	492
Coal Oil.....		313
Antimony .....Tons.	645	26,370
Copper Ore..... "	1	160
Manganese ..... "	18½	590
Gold Refuse .....		150
Salt .....Bush.	43,881	8,308
Stone and Marble.....		195
		<hr/>
		\$484,462

# FINANCIAL STATEMENT.—GOLD.

Mines Department for Twelve Months ended 31st December, 1886.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Totals.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Totals.
Caribou.....	\$114 00	\$879 87	\$993 87	.....	.....	\$23 77	.....	\$33 77
Darr's Hill.....	.....	2644 68	2644 68	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	276 00	.....	276 00	16 00	.....	.....	\$64 25	80 25
Gay's River.....	54 00	.....	54 00	.....	.....	.....	10 00	10 00
Lawrencetown.....	.....	10 95	10 95	.....	.....	.....	.....	.....
Montague.....	64 00	160 87	224 87	.....	.....	.....	.....	.....
Oldham.....	8 00	706 85	714 85	.....	.....	7 69	36 00	43 69
Ovens.....	62 00	1 19	63 19	.....	.....	16 13	.....	16 13
Renfrew.....	204 00	134 48	338 48	.....	.....	6 72	36 00	42 72
Sherbrooke.....	118 00	492 27	610 27	12 00	.....	25 26	446 24	483 50
Stormont.....	338 00	340 88	678 88	22 00	.....	.....	39 50	61 50
Tangier.....	36 00	176 67	212 67	80 00	.....	.....	27 12	107 12
Uniacke.....	.....	225 56	225 56	.....	.....	2 83	97 50	100 33
Waverley.....	12 00	90 61	102 61	8 00	46 60	.....	.....	54 60
Wine Harbor.....	34 00	5 80	39 80	.....	.....	.....	5 50	5 50
Unproclaimed.....	2474 00	2679 48	5153 48	408 00	.....	90 35	545 81	1044 16
Prospecting Licences.....	.....	.....	8896 72	.....	.....	.....	.....	460 51*
	\$3794 00	\$8550 16	\$21240 88	\$546 00	\$46 60	\$182 75	\$1307 92	\$2543 78

\*Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1886.

COUNTIES.	RECEIPTS.				EXPENDITURES.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis .....	\$ 20 00	.....	.....	\$ 20 00	.....	.....	.....
Antigonish .....	80 00	.....	.....	80 00	.....	.....	.....
Cape Breton .....	840 00	\$200 00	\$44210 80	45250 80	.....	\$1486 15	\$1486 15
Colchester .....	100 00	.....	.....	100 00	.....	.....	.....
Cumberland .....	460 00	50 00	30534 90	31044 90	60 00	472 00	532 00
Digby .....	20 00	.....	.....	20 00	.....	.....	.....
Guysborough .....	.....	100 00	.....	100 00	.....	.....	.....
Halifax .....	20 00	.....	.....	20 00	.....	.....	.....
Hants .....	100 00	.....	.....	100 00	.....	.....	.....
Inverness .....	160 00	25 00	16 45	201 45	.....	.....	.....
Lunenburg .....	20 00	.....	.....	20 00	.....	.....	.....
Pictou .....	940 00	100 00	26894 38	27934 38	.....	483 00	483 00
Richmond .....	120 00	25 00	.....	145 00	.....	.....	.....
Victoria .....	100 00	.....	.....	100 00	20 00	.....	20 00
Renewals Coal Leases .....	.....	.....	.....	479 50	.....	.....	.....
Block-house Colliery .....	.....	.....	.....	.....	.....	.....	1338 32
Examinations .....	.....	.....	.....	.....	.....	.....	312 87
	\$2980 00	\$500 00	\$101656 53	\$105616 08	\$80 00	\$2441 15	\$4172 34

ABSTRACT ACCOUNT.

Receipts and Expenditure for the twelve months ended 31st December, 1886.

RECEIPTS.	EXPENDITURE.
Licenses to search Coal .....\$ 2,980 00	Return Licenses to Search.....\$ 80 00
" Work Coal ..... 500 00	Salaries and Surveys..... 2,441 15
Royalty ..... 101,656 53	Block-house Colliery..... 1,338 32
Renewals Coal Leases..... 479 50	Examinations..... 312 87
-----\$105,616 03	-----\$4,172 34
Rent—Gold ..... \$3,794 00	Return Rents.....\$ 546 00
Royalty ..... 8,550 16	" Royalty..... 46 60
Prospecting Licenses..... 8,896 72	Royalty Commission..... 182 75
-----\$ 21,240 88	Salaries and Surveys ..... 1307 92
	Return Prospecting Licenses..... 460 51
	-----\$2,543 78
	General Expenses .....\$5,453 87
	Law Expenses ..... 445 64
	Postage..... 158 28
	Stationery and Printing ..... 468 26
	-----\$6,526 05
	-----\$13,242 17

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**REPORT**

**OF THE**

**DEPARTMENT OF MINES,**

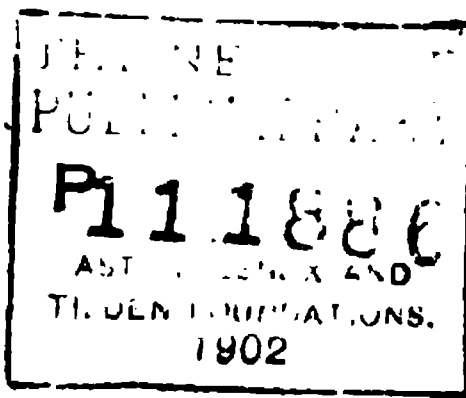
**NOVA SCOTIA,**

**FOR THE YEAR 1887.**

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**HALIFAX, N. S. :**  
**COMMISSIONER OF PUBLIC WORKS AND MINES,**  
**QUEEN'S PRINTER.**

**1888.**



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**CORRECTION.**—Page 3, for "Barytes, 4,000 tons," read "400 tons."



DEPARTMENT OF MINES.

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REPORT FOR THE YEAR 1887.

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*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the  
Province of Nova Scotia, &c., &c.*

**MAY IT PLEASE YOUR HONOR,—**

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

**CHARLES E. CHURCH,**

*Commissioner of Public Works and Mines.*

**HALIFAX, March 2nd, 1888.**



# REPORT

ON THE

## MINES OF NOVA SCOTIA,

BY EDWIN GILPIN Jr., A. M., F. G. S.,

(Fellow of the Royal Society of Canada, Etc.)

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, March 1st, 1888.

TO THE HONORABLE  
CHARLES E. CHURCH, M. P. P., M. E. C.,  
*Commisioner of Public Works and Mines.*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending Dec. 31st, 1887.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1887, compared with that of the previous year :

		1886.	1887.
Gold.....	Ounces....	23,362	21,211
Iron Ore .....	Tons.....	44,388	43,532
Manganese Ore .....	" .....	427	691
*Coal raised .....	" .....	1,502,611	1,670,838
*Coke made .....	" .....	31,604	28,748
†Gypsum.....	" .....	123,753	116,346
Building Stone .....	" .....	8,000	9,271
Barytes .....	" .....	230	4,000
†Grindstones, &c .....	" .....	1,600	32,669 ‡
†Moulding Sand.....	" .....	200	160
†Antimony Ore .....	" .....	645	400
Limestone .....	" .....	20,265	31,471

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

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\* Ton of 2240 lbs.  
† Amount exported.  
‡ Value in dollars.



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In addition to detailed notices of the operations of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced not paying royalty to your Honorable Government.

I also beg to enclose the reports of Wm. Madden, Jr., Esq., Deputy Inspector for the Counties of Cumberland, Pictou and Colchester, and of P. Neville, Esq., Deputy Inspector for Cape Breton.

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## COAL TRADE.

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The total sales for the year 1887 amounted to 1,519,684 tons, against 1,373,666 tons in 1886; being an increase of 146,018 tons.

As compared with the sales of the year 1886 the most noticeable points are:

The home sales were 469,464 tons, compared with 460,237 tons in 1886.

The Province of Quebec took 650,858 tons, against 538,762 tons in 1886, and 493,917 tons in 1885, and 396,782 tons in 1884.

The sales to New Brunswick were 186,511 tons, compared with 175,918 tons during the preceding year.

Newfoundland took 82,053 tons, against 71,476 tons in 1886.

The sales to Prince Edward Island were 50,615 tons, against 49,168 tons in 1886.

The sales to the United States comprised 2,558 tons of round, 35,722 of slack, and 35,612 tons of run of mine coal; in all 73,892 tons, against 66,003 tons in 1886. Of this amount all the run of mine was sent from Parrsboro. The total Cumberland shipments being 41,387 tons. Cape Breton sent to the same market 29,285 tons of slack and 1,851 tons of round coal.

The coal trade to other countries presented no points of interest.

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### CUMBERLAND COUNTY.

The total sales of this county amounted to 465,148 tons, against 416,266 tons in 1886.

The home sales were 91,335 tons, against 103,886 tons in 1886.

The sales to New Brunswick amounted to 130,305 tons.

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The Province of Quebec took 202,121 tons, compared with 188,935 tons in 1886.

The Port of Parrsboro has become an important outlet for the Springhill district, and during the past year 41,387 tons were shipped;

The freights from this point to the United States are comparatively low, and the harbor remains open nearly all the year. The Cumberland Railway and Coal Company are constructing a line from Springhill to Oxford, which will give them an outlet to a shipping point on the Gulf of St. Lawrence, and cheapen the cost of laying down their coal at Quebec and Montreal. The completion of the Joggins and Macan Railway has led to the re-opening of the small collieries which have been worked at various periods between Macan and the Joggins shore. The Joggins Mining Association, which has been compelled to close its mines every winter, is now able to work steadily; and it is to be hoped that its owners will reap the benefits of their spirited policy.

#### COLLIERIES.

*Chignecto.*—The workings at this mine have not undergone much change, the output having been 16,480 tons. In my last report I referred to the trouble experienced at this mine from spontaneous combustion, and similar difficulties have been experienced last year. The discovery recently made that carbon monoxide requires the presence of moisture before it will ignite, may serve to explain some of the phenomena observed in mine fires. In this seam the heating noticed when the roof and top coal become mixed, turns to fire if water be not kept carefully from it. A similar cause may explain explosions from mine fires when they are surrounded by an atmosphere apparently so full of carbonic acid that ignition of fire damp appears improbable.

At the Joggins mine some trouble has been experienced from a fault, but it was driven through and the coal found to be of good quality. The output of the mine was 16,649 tons, against 22,243 tons in 1886.

At the Macan and Hobert mines there was little done of consequence. The engine and bank house of the Patrick mine were burned down in the fall, but at the close of the year repairs were effected.

*Springhill.*—The operations at this mine have, as usual, been on a very large scale. The opening in the Syndicate seam has been continued, and the East levels holed into the North slope levels. The coal, which was at first disturbed, has become more regular and settled, and the slope will form an important addition to the resources of the district. Further particulars will be found in Mr. Madden's report. The output of the mine was 466,223 tons compared with 416,769 tons in 1886.

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## PICTOU COUNTY.

The total sales were 339,034 tons, against 369,026 tons in 1886, and 396,000 tons in 1885.

The home sales were 193,062 tons, against 202,516 tons in 1886.

The Province of Quebec took 95,310 tons, as compared with 95,499 tons in 1886.

*Acadia Coal Company.*—The output of this Company was affected in the early part of the year by a strike against a reduction of coal cutting rates at the Albion mines. At the Vale Colliery the McBean seam was worked steadily, and little done at the six feet seam, which was being unwatered and prepared for work at the close of the year. The output was 230,611 tons. At the Albion mines the Third seam was worked, and the slopes and levels extended. The south side of the McGregor was worked. Preparations were made for beginning a slope in the Cage Pit or Deep Seam to the rise of the old shaft, to strike an old balance near the East level workings, in order to win the coal to the north-east of the present workings. This project unfortunately was prevented by the discovery that the fire in the West rise workings of the Cage pit was not extinguished. The fire had been built off I think in 1872, and it was believed to be quite out, especially as the fire in the same mine, caused by the Foord pit explosion, was found to be out when the mine was re-entered. During the summer part of the pillars in a balance in the Third seam workings under the Cage pit seam had been drawn, the fall of the roof extended up to it, and stythe came into the Third seam workings. The balance was isolated by stoppings, and at the close of the year no trouble was anticipated. In the beginning of this year, however, fire broke out in the Third seam with great violence, destroying the bank head and necessitating the closing of the mine.

At the Foord pit the water has been lowered to about forty feet above the sheets, at this point the fire was found to have injured the cage slides, etc., but the timbering appeared to have been uninjured. It is expected that, if explorations show the feasibility of building off the old workings, these costly pits, with their massive and valuable engines, will be again available for working the deeper seams. There were 10,180 tons of coke made.

*Acadia Colliery.*—As usual, the systematic workings of this mine present no new points of interest. The new 3,100 feet levels have been extended in readiness for the regular sequence of work. Mr. Madden reports that for twelve months no accident has occurred in this mine.

*Intercolonial Coal Company.*—The operations of this Company have been vigorously prosecuted during the past year. The slopes are now down 3,200 feet. The extraction of pillars has been continued, but great care has been required, owing to the constant exudation of gas. The Second seam pit was unwatered, and the levels extended. The output was 152,825 tons, against 108,498 tons in 1886.

## EAST RIVER AREA.

Messrs. Muir & Sons re-opened the old George McKay slope, close to the east line of the East River area. They deepened the slope, and have driven west until their faces are past the old workings. The seam runs nearly four feet in thickness, and is of excellent quality, as shown by the following analysis made for the Geological Survey of Canada :—

Hygroscopic Water.....	none.
Volatile Combustible Matter.....	29.98
Fixed Carbon .....	62.15
Ash, (Buff colored).....	7.87
Sulphur .....	trace.
	<hr/>
	100.00

The returns show 1,145 tons of coal extracted.

Some prospecting was done by Mr. McNeil on the Merigomish area but I have no particulars of his work.

Mr. A. McG. Barton informs me that he bored 220 feet for coal on the west side of the West River, at the Twelve Mile House. The first 90 feet was through gray rock, and the balance through shale, and red and gray sandstone. Two bore holes, 60 and 70 feet deep, were put down on the east bank of the River, through similar material. The work will be resumed next season.

## CAPE BRETON COUNTY.

The total sales were 715,442 tons, compared with 588,191 tons in 1886.

The home sales were 188,781 tons, against 153,652 tons in 1886.

New Brunswick took 30,464 tons, as compared with 26,284 tons in 1886.

The sales to Newfoundland were 81,323 tons, compared with 71,018 tons during the preceding year.

The sales to Quebec show 329,229 tons, against 254,328 tons in 1886.

The United States took 1,851 tons of round and 29,285 tons of slack coal.

## COLLIERIES.

*Sydney.*—The workings have been steadily continued, and the output was 170,782 tons, against 139,646 tons in 1886. The level workings were partly stopped in the fall, owing to a small leak of salt water in the roof. There is a good cover at this point, and it may be a leakage due to a fault or disturbance of the strata near this point,

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as the workings are approaching the locality where the transition between the level seams of the Sydney district and the pitching seams of Low Point may be expected to begin. The Francklyn lease has been worked through the Sydney Colliery, and 5,422 tons extracted.

*Victoria.*—The operations at this mine have been steadily continued during the year, and the output shows an increase, being 61,057 tons, against 50,156 tons in 1886. Mr. Donald Lynk, many years manager of the mines in the Lingan district, has resigned his position, and Mr. I. G. S. Hudson has been appointed in his place.

*Reserve.*—At this mine the French slope has been extended, and further provision made for pumping and ventilation. The connections with the Emery seam have been completed, and coal can be raised whenever required. The output of the mine was 88,849 tons, against 81,783 tons in 1886. The concentration of the works, shops, etc., at the Reserve has been found satisfactory from all points. In the new workings the fire clay parting has run out, leaving about 8 feet 9 inches of good coal. It will be remembered that this parting in the Phelan seam is insignificant on the shore of Lingan Bay, swells in about one-half a mile, until the seam is divided in two by 9 feet of stone, having 3 feet of coal above and 6 feet of coal below, and again runs out as noticed above.

*International.*—At this mine the output was 109,404 tons, as compared with 118,129 tons in the preceding year. In driving the rooms toward the shore of Lingan Bay the water from the coal was found to be brackish, while that from the roof was fresh. A barrier of 400 feet was left along the shore, with a view to the rapid wasting of the coast line. The level engine was found to work satisfactorily. As the workings of this Colliery have become very extensive, the management contemplate providing mechanical ventilation.

*Bridgeport.*—Mr. Mitchell has continued working, and has commenced the extraction of pillars above the water level. The output was 19,265 tons, against 14,344 tons in 1886.

*Little Glace Bay.*—A new rise incline has been driven through the old works to shorten the haulage from the face. The output has been 79,516 tons, against 33,382 tons in 1886. The harbor has been maintained in good repair during the season, and is now of more importance than a private dock, as the other harbors of Lingan and Caledonia have been abandoned.

*Ontario.*—The level has been extended, and some coal taken out.

*Block House.*—A few thousand tons have been extracted from old pillars to the rise of the water level. A considerable portion of the gear seized for royalty has been disposed of, and the Government are desirous of finding purchasers for the engines and pumps, etc.

*Gowrie.*—This mine has been extensively worked, the output being 128,477 tons, compared with 93,307 tons in 1886. About 800 tons of patent fuel were manufactured. This fuel finds favor for steam pur-

poses, being largely used by the French men-of-war, and should be well adapted for open grates. It would appear that a briquette machine set up in a large New England town, or in Montreal, and taking slack from run of mine coal, screened at port of discharge, would prove profitable. The extraction of pillars has been continued in the rise workings, and the coal found beyond the fault struck in the main level.

*Caledonia.*—The operations in the new lift have been continued steadily to the East and West. Pillars were drawn in the old workings. On the surface the rolling stock was largely increased. In the fall the ventilation was improved by a systematic arrangement of doors, enlarged over casts, etc. The output was 108,844 tons, compared with 72,810 tons in 1886.

Reference has been made in previous reports to the Eight foot seam at Cow Bay, usually referred to as the Neville seam, from its discovery a number of years ago by Mr. P. Neville, now Deputy Inspector of Mines. Explorations show that the seam lies nearly in the horizon of the Long Beach seams of Northern Cow Bay, underlies the Block House and Gowrie areas, and extends a considerable distance to the North of them. A large tract of the seam has been acquired by Montreal parties, and it is hoped that it may soon be developed. I have not seen any analysis of the coal, which is said to be of excellent quality, and it will without doubt prove a most valuable addition to the coal resources of this district. A branch line about two miles long would connect the new property with the Sydney and Louisburg Railway.

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## OTHER COUNTIES.

During the summer three seams of Anthracite coal were reported as having been discovered near Mabou, Inverness County, and to be from three to eight feet thick. The samples which came under my notice resembled the so-called Anthracite of Lepreaux, near St. John, New Brunswick, and evidently contained considerable percentage of ash. The Lepreaux coal occurs in strata of Devonian age, and may be classed as a highly carbonaceous shale.

A little work was done at Coal Brook, Onslow, Colchester County, on a coal bed said to be four feet thick. Messrs. W. J. Fraser and H. Ross did a little work on their area at Mabou. The expectation of a railway from Sea Coal Bay, in Richmond County, to Margaree, has to some extent revived an interest in the Western coal fields of Cape Breton.

In Antigonish County, at Hallowell Grant, explorations conducted by Mr. A. McBean are said to have shown a bed of oil coal several feet in thickness. The existence of several beds of this mineral, and of large deposits of highly bituminous shale in this district, was proved by exploratory works carried on a number of years ago.



## DEPUTY INSPECTORS' REPORTS.

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### DISTRICT OF PICTOU, COLCHESTER, AND CUMBERLAND.

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WESTVILLE, N. S.,  
December 31st, 1887.

TO E. GILPIN, ESQ.,  
*Inspector of Mines, &c.*

DEAR SIR,—I have the honor to herewith submit you a statement of my work as Deputy Inspector of Mines in the District of Pictou, Colchester and Cumberland, for the year ending the 31st December, 1887.

#### SPRING HILL MINES.

This mine has attained to a daily output of from 1800 to 2000 tons. Too much cannot be said of the caution exercised by the management in respect to the care of the mine, and to the safety of the workmen engaged therein. A few accidents of a fatal nature have occurred however, as see noted in table at end of this report. The South slope, in my last report, was down about 1800 feet; in March of this year they commenced sinking it again, and in May had gained a depth of about 2200 feet. The coal looks very good. In June they finished sinking the East slope, which was down about 1900 feet. A new blow-down fan has been erected at the East slope, but the airways, not being fully completed, a satisfactory test as to its effective powers has not been obtained. Gas is evolved in this slope and in the West slope. The new fan erected at West slope is giving very good satisfaction. The South slope and North slope have, during the year been connected, and doubts set at rest as to the identity of the seam. The water of the South slope will now be conducted to the lodgement of the North slope, and from thence delivered at surface by the Allison pump.

In my official inspection of these Mines I have found the law complied with and the discipline good.

#### CHIGNÉCTO.

This mine has not worked extensively during the year. The management have succeeded in "building off" the fire on east side and have it under control. In November, some indications of fire were noticeable on the west side, but the management took prompt measures to "build it off," which measures were successful. I have always found the air satisfactory in this mine, and the management complying with the laws. In December an opening had been made in the "stopping," and the fire to all appearances was extinguished

## JOGGINS.

The break, to which reference was made in my last report, proved to be about 70 feet thick, at which point the coal was struck again and maintained a uniform good appearance for a distance of some 200 feet, where they encountered another break, which proved to be about 60 feet thick when the coal was again obtained. I found the ventilation very fair and the law complied with.

## PATRICK.

In my visit in March I found the engine house, &c., finished, the water being taken out of the Slope, and in April I was able to inspect the working faces, the water being all out. A small number of men were kept at work during summer. The ventilation was not all that could be desired. A new airway has been recently driven, which will materially increase the volume of the air. On November 3rd the engine house was burnt, and at my visit in December they had not succeeded in erecting a new one, but anticipated being able to start about the 15th or 18th of December to extract the water from the mine.

## LAWSON.

This mine has been standing with water for a considerable portion of the year. A small force of men, averaging about 5 or 6, have been at work at different times. In December every preparation has been made to enable them to extract a fair output of coal for the incoming season. The Minudie, Milner and Boston Mining Co., and Scotia mines, have done no work this year.

## INTERCOLONIAL COAL COMPANY.

At this mine they have sunk a distance of 560 feet in their slopes, which are now down a distance of about 3200 feet from the surface. A considerable amount of successful pillar working has been carried on during the year. On the north side when some gas was given off, the management promptly discontinued the use of powder. Later in the season they began to extract the pillars between the 1700 feet level and the 2200 feet level on south side; gas was given off in these pillars also, but every possible precaution in such cases was adopted by the management. A very satisfactory quantity of air travels the working faces.

The water was extracted from the Scott pit in November, and the South Level extended with a view of prospecting the seam.

## ACADIA COAL COMPANY, (LIMITED.)

*Vale Colliery.*—I have found in my inspections of this mine the air current circulating very satisfactorily through the working faces of the mine, and the law complied with. The management intend to open the workings of the 6 foot seam, which have been suspended since February, and have commenced to take out the water.



*Acadia Colliery.*—In this mine they have succeeded in extracting a good percentage of coal from the pillars of the top-lift. In all inspections I found the air well kept up to the working faces, and in consequence no gas is allowed to accumulate. The discipline in the mine is good, and it is a record worthy to be noted, that during the past twelve months not an accident has occurred in this mine. On the 3100 ft. lift levels are driven near by to the boundary line, main slope completed, also travelling slope and pipe head. Three balances are driven from 3100 foot level to 2400 foot level, and this winning is thus in a position to receive the full working plant of top lift as soon as the pillars are fully extracted. I might add as an item of interest to coal operators in general, that in this mine they utilize the pressure of water in the column pipe to extract the water from 3100 ft. lodgement to the main receiver, where a large pump is situated at 2400 ft. level.

*Slopes Nos. 1 and 2, Douglas Seam, Stellarton.*—A new fan of 12 ft. diameter, running about 25 revolutions per minute, but which can be increased, if necessary, to some 75 to 100 revolutions, has been erected which ventilates Nos. 1 and 2 slopes. These slopes are connected by a cross cut at the 1400 ft. level, and an undercast at furnace level. No. 2 slope is now down a distance of 2000 feet, and the work getting well opened up. In August they began to extract the pillars in No. 1 slope at 800 ft. level, and a considerable number were taken out, until, in December, there were signs of fire in the Cage Pit seam which overlies these slopes a thickness of about 130 feet intervening, and as some damp issued from the broken, the management thought it advisable to "build off" these pillars with brick stoppings, which has been done.

*McGregor Pit.*—Operations were resumed on the south side of this pit in January, and continued on to some extent during the year.

I have visited the Cage Pit workings on two occasions and found them in as good condition as could be expected; but I regret to say that the day subsequent to my visit in December, there appeared serious indications of fire being still in existence.

The management have succeeded in taking the water out of the Foord Pit to within about 50 feet of the bottom, and are now meeting with considerable obstruction, caused by the needles and slides in shaft being burned. Progress, in consequence, is necessarily slow, but they are patiently persevering with the view of gaining the bottom.

#### EAST RIVER.

John Muir & Son still continue work on this area, and had at some seasons of the year as high as twenty men, and at other seasons three or four men employed. At the present time eight men are at work. The coal maintains a uniform thickness and looks well. The air is satisfactory.

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**BLACK DIAMOND COMPANY.**

A company, composed principally of New Glasgow capitalists, has purchased the Nova Scotia Coal Company's property, and has commenced work. They have utilized the old travelling road for hoisting, and have laid a track along the top level on West side, a distance of 1,500 feet, to a block of coal, where they anticipate working four or five close bords. They have erected a fan of about 5½ feet diameter, with which they propose to ventilate the mine. A new bank house has been built, the old bank house and screens repaired, and a new engine house built. They have a siding from the Pictou Branch, which runs close by, affording them excellent facilities for shipping coal.

The Haliburton mine was opened in February by Andrew Wier. He did little or nothing during the summer, his sales depending altogether upon the immediate neighborhood.

I visited Acadia Iron Mines on the 15th October, A. D. 1887, and found the West shaft had been sunk, previous to my visit of last year, 50 feet, and a large Cameron pump placed in the bottom. They were extending the drifts East and West. Ventilation was good, and the mine looked well.

There have been a number of trifling accidents to those employed in the mines which I have inspected—which I have not given in the appended table. I think it right to say here that employees in coal mines should remember that they have an interest in the maintenance of good discipline equal to that of the owners and bosses. A reference to the special rules in force in nearly all the mines will show that, legally speaking, any man who neglects to report an infraction of the regulations in force in the mine in which he works, is directly culpable. To any right thinking collier this should be an unnecessary law, for he has it in his power, by precept and example, frequent opportunities to instil into the minds of his comrades the necessity for careful and intelligent obedience, which in no way can destroy proper self respect. The individual miner, as he works at his face, should remember that on his caution and intelligence his own safety and that of many others may rest at any moment.

Injuries from fall of roof and coal should never be due to individual recklessness, for every miner is entitled to proper supplies of timber, and to the prompt help and advice of those in charge whenever he detects danger.

I herewith append the usual tabulated statements, giving number of serious accidents and causes, volumes of air circulating, means of discharging water from mine, &c., &c.

I remain, your obedient servant,

WM. MADDEN, JR.,

*Deputy Inspector of Mines.*

## ACCIDENTS, YEAR 1887.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	Feb. 7	Spring Hill	Wm. McDonald	Miner	Killed by fall of coal from face of Bord.
2	" 17	Vale Colliery	Mat Spoors	Day overman.	Killed while timbering.
3	" 17	"	Wm. Hydo	Miner	" "
4	April 2	Spring Hill	George May	"	Fatally hurt.
5	May 28	"	— Cameron	"	Arm broken. Stone fell from roof.
6	June 25	"	James Mackie	Cage runner.	Leg broke; caught by cage in balance.
7	July 28	Drummond Colliery	John McEwen	Deputy	Hip dislocated. Cage run over him.
8 {	Sept. 2	Spring Hill	James Johnston	Blacksmith	} Ribs broke, hip dislocated. Jammed by fall of rake against the wall in West Slope.
9 {	" 5	Douglas Seam, No. 2 Slope	Daniel McLean	Miner	
10	" 6	Spring Hill	Frank Welsh	"	Hurt inwardly. Jammed between the rake and wall trying to get on cars when in motion.
11	" 10	Douglas Seam, No. 2 Slope	Wm. McKenzie	Miner	Leg broke by the rake in West Slope.
12	Oct. 6	Spring Hill	James Miller	"	Leg broke. Fall of coal from pillar.
13 {	" 18	Vale	Angus O. Hanley	Boy	} Leg broke. Fall of coal from working face.
14	" 29	Spring Hill	Wm. Booth	Miner	
15 {	Nov. 11	"	Peter Coleman	"	} Killed. Three boxes run back over him on Main Slope.
16	Dec. 8	"	Thomas Guthro	"	
17	" 8	"	Clinton Crawford	"	Burnt. Gas in West Slope; not serious.
					Cut badly on head and foot. Top coal fell on him.
					Killed. Fall of frozen clay.
					" " "

Volume of Air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines—year 1887.

COMPANY.	MINES.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mode of Ventilation.
Spring Hill Coal Comp'y	N. Slope	43,468	42,750	41,500	42,885	47,250	42,672	40,800	41,000	42,400	42,200	43,500	43,982	} Threfans.
	W. "	22,000	22,000	21,100	23,100	42,200	22,000	41,160	40,200	42,100	42,200	42,850	41,705	
	E. "	42,000	42,000	40,200	41,000	32,000	31,500	31,200	30,000	31,800	34,350	33,700	33,200	
	S. "	13,000	....	14,500	14,000	13,000	13,100	12,700	23,400	21,500	22,000	20,500	22,700	Natural Ventilation.
Chignecto Mine	Slope	28,200	26,100	24,200	....	20,000	19,706	21,200	20,500	23,000	22,000	23,500	23,900	Furnace.
Joggins	"	24,225	22,150	21,000	26,000	27,900	23,100	22,500	17,100	19,000	21,200	22,150	24,100	Furnace.
William Patrick	"	Idle.	Idle.	Idle.	3,100	3,000	2,700	2,200	Idle.	2,500	2,500	Idle.	Idle.	Natural Ventilation.
S. E. Freeman, (Lawson Mine)	Slope	Idle.	Idle.	2,000	Idle.	Idle.	1,700	1,650	1,000	Idle.	2,000	2,700	2,700	Natural Ventilation.
Intercolonial Coal Comp'y, Westville	Drummond Slopes.	86,500	85,600	89,800	89,000	85,500	81,300	87,000	85,500	84,600	80,800	85,200	82,500	Exhaust Fan.
Acadia Coal Co., Limited.	Acadia Slope	60,000	45,000	40,000	44,600	57,680	59,000	62,000	68,000	44,800	50,500	58,000	62,200	Exhaust Fan.
	No. 1 "	Idle.	21,600	Idle.	Idle.	19,040	23,100	21,300	24,150	44,120	33,600	33,700	35,000	} Fan.
	" 2 "	Idle.	12,700	Idle.	Idle.	16,600	20,000	18,000	23,040	33,800	25,200	25,500	27,000	
	McGregor Pit	48,000	20,000	Idle.	Idle.	Idle.	Idle.	Idle.	68,360	77,100	80,757	84,200	69,860	Exhaust Fan.
Vale	Greener Slope (6 ft. Seam.)	....	....	18,500	Idle	for	balance	of	year.	....	....	....	....	Blow-down Fan.
"	McBean Slope (Old Seam.)	40,500	19,800	20,120	39,400	41,050	40,000	42,100	41,000	33,500	40,200	46,000	42,000	Exhaust Fan.
John Muir and Son, East River Area	Slope	2,300	2,000	2,300	2,250	1,500	1,000	1,800	1,200	1,000	1,700	1,950	2,200	Natural Ventilation.

## DETAILS OF PUMPING APPLIANCES.

COMPANY.	Appliances.	Length of Stroke.	Diameter Steam Cylinder.	Diameter Water Cylinder.	Number of strokes per minute.	Steam pressure at boiler.	Distance of boiler from pump in ft.	Steam pressure at pump.	Vertical height of discharge.	Pressure of head per sq. in. lbs.	Length Steam Pipe.	Length Water Pipes.	Diameter Water Pipe.	Diameter Steam Pipe.	Average gallons discharged per day.		Tons of water raised year 1887.	Tons of coal raised year 1887.	REMARKS.
INTERCOLONIAL COAL COMPANY. Westville. Connected.	Cameron Pump. No. 8.	36 in.	18 in.	8 in.	20 to 40	lbs. 79½	480	lbs. 79½	350	lbs. 208	800	.....	.....	5 in.	.....		.....	.....	Pipe covered with com- position.
	No. 3-5.	12 "	10 "	4 "	40 to 60	80	1380	77½	300	130	900	900	3 x 2½	2 x 2½	60,000		109,500	152,825	Pipes covered with a com- position of clay and straw.
	Bot. No. 3-4.	12 "	7 "	3½ "	40 to 60	75	1780	75	113	49	400	400	2 in.	2 in.	120,000 per day of 24 hours.		219,000	.....	Covered for 40 ft. on bank with infusor- ial.
(Westville) ACADIA SLOPE.	Duplex Compound Pump.	24 "	12 H.P. 22 L.P.	5½ "	45	50 lbs.	2600	40	996	433	2600	2400	.....	4 "			26,197	.....	Approximate estimation. Pipes covered to pit head. Bal- ance of pipes in mine ex- posed.
ACADIA COMPANY, LIMITED. McGre- gor Pit. Nos. 1 and 2 Slopes. Foord Pit.	Cameron Pump.	16 "	.....	4 "	30	45 "	200	40	180	78	200	180	3 in.	3 "	14,355		32,850	.....	
	.....	Hoisted by	Iron	Iron	Tank	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,000		484,625	230,611	
	Two	30 in.	30 in.	8 in.	25	70 lbs	1400	60	650	282	1400	1200	.....	6 in.	234,000	Disch'rgs to mid. pump.	459,900	.....	
VALE McBean Slope. Connected.	Knowles.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000	Disch'rgs at surface. Used as a spare pump.	.....	.....	
	Cameron.	24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	800	.....	.....	.....		.....	.....	
	Top. Mid. Bot.	24 "	15 "	5 "	50	80	1240	70	365	159	1240	140	.....	.....	.....		.....	.....	
Greener 6 foot Beam. or	Cameron Pump. Blake Pump.	12 "	8 "	5 "	60	.....	570	.....	130	57	510	310	.....	.....	.....		.....	.....	
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	

Spring Hill Mines.															Pipes not cov- ered.		
Joggins.	Chignecto.	Connected. West Slope.	Connected. Top.	Bottom.	Pump.	Allison Pump.	Special Blake.	Blake not used.	Connected. Cameron Pump.	No. 7.	No. 5.	No. 3.	Boxes.	Lifting Pump.	Lifting Pump.	153,300	16,649
																Disch'rgs at surface.	Disch'rgs to top pump.
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## MINES REPORT.

# OFFICIAL INSPECTION FOR YEAR 1887.

[illegible]

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CAPE BRETON.

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BRIDGEPORT, *January 7th, 1888.*

E. GILPIN, ESQ.,

*Inspector of Mines:*

DEAR SIR,—I beg leave to lay before you a report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1887.

## SYDNEY MINES.

I have visited this mine eleven times during the year, viz., February 9th, March 10th, April 29th, May 26th, June 4th, July 20th, August 13th, September 20th, October 21st, November 11th, and December 10th. On all these visits I found the mine working in a satisfactory manner. South of the pit bottom an angle deep has been driven from the main South level, eastwardly through the waste workings, and a new landing laid down at the face of the present workings, for the purpose of shortening the haulage from that direction. The coal is drawn from this section over the road to the pit bottom by means of an engine and tail rope. About the 1st of September a leak of salt water was observed coming through the roof at the face of the South water level, in consequence of which the two levels and eleven rooms immediately below them were discontinued, and a leveling made in order to ascertain the thickness or cover from the leak to the bottom of the sea. The leveling was as follows: Commencing at the main shaft, (the shaft is six hundred and eighty-two feet deep to the bottom of the coal) a distance of eighty-nine chains, the leak proved to be two hundred and twenty-four feet higher than the pit bottom. The cliff above the sea is forty-two feet above or higher than tide level. The depth of water above the level and leak is thirty two feet, leaving three hundred and eighty-four feet of covering between the bottom of the sea and top of coal. I learned from Mr. Brown that this is about the centre of the channel, and the deepest water between Sydney Mines and Low Point. When the water was first discovered it was measured, and found to leak at the rate of one-half gallon per minute. It has been measured several times since, and found to run at exactly the same rate. There has been very little water pumped from the drowned district this season, owing to the great drouth and scarcity of surface water; however, there is ample room without this district for a larger number of workmen that is at present employed.

## VICTORIA.

I made twelve official visits to this mine during the year. It worked steadily throughout 1887. A new lift of six hundred feet has been gained in line with the West slope. Levels have been driven



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East and West from the bottom of the slope; the East levels are driven with a slight dip, so as to carry the water in that direction, and when driven in line with the centre slope a lodgment for the water will be made on the low side, and a headway will be driven to connect with the centre slope for the purpose of pumping the water therefrom. A balance is being driven from the new lift. The levels are being pushed on in the upper lift and balances driven. The timbering is good, and in general the Mines Regulation Act is strictly observed. On the bank, what is termed here a "Billy fairplay," has been erected for the purpose of weighing the slack coal taken from the pit and screens, which seems to give general satisfaction.

#### OLD BRIDGEPORT.

This mine has been inspected by me eight times, viz.: April 25th, May 25th, June 24th, July 27th, August 15th, September 22nd, October 29th, and December 6th. Above the pit bottom, towards the rise, a section of pillars have been successfully drawn. The roof in this mine is very good, and well adapted for the extraction of pillars. A portion of the roof has been taken down around and above the pit bottom for safety, and to make more height. The South of the pit bottom has been well secured with timber, and a stone pillar built. The cupola and furnace mentioned in my report for 1886 is not yet finished, but I am happy to report that Mr. Mitchell has turned his attention to it, and has men now working at the cupola, and inform me that he will have it completed by the first of next season.

#### RESERVE.

I have visited this mine thirteen times during the year. A new lift of five hundred feet has been gained from the bottom of the French slope. A number of pillars have been extracted from No. 1 and No. 4 lifts in the main slope. A new pump has been placed in the new lift which pumps all the water from the East side workings. The castings of this pump were made in South Sydney, at the new foundry, and the fitting and finishing done at the mines. It is of the following dimensions: Diameter of steam cylinder, fourteen inches; diameter of water cylinder, nine inches; length of stroke, twenty-four inches; number of valves, four; diameter of discharge, six inches; diameter of suction, six inches. This pump gives good satisfaction. A new cupola have been built over main furnace last spring. Mr. Routledge says it is intended to build a larger furnace there this winter, and another at the bottom of the West cupola.

#### INTERNATIONAL.

I have made several visits here through the season, viz.: April 22nd, May 23rd, June 24th, July 26th, August 10th, September 15th, October 5th, November 25th, and December 7th. All the coal mined in this colliery the past year was taken from the dip slant workings. A section has been laid off for mining in the North district of the dip slant. The rooms here are thirty feet wide, and the pillars eighteen.

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The management here appear to approve of this method of working the coal, as they think a greater percentage of coal can be procured with less labour, and a smaller percentage of slack coal made. It is also their intention to reduce the pillars to a very small size in other parts of the mine, and work the coal in pannels. To the new pump mentioned in my last report is added eighteen hundred feet of six inch delivery pipe. They have also placed another screen on the bank in addition to the one mentioned in the Inspector's report for 1886.

#### LITTLE GLACE BAY.

I have made ten official visits to this mine during the year, viz.: March 16th, April 20th, May 4th, June 20th, July 4th, August 1st, September 7th, October 24th, November 22nd, and December 22nd. A number of pillars have been taken out from the rise West workings. Also a section of rooms have been widened from sixteen to twenty-four feet, leaving the pillars eight feet thick. This method of working is proving very profitable here, as a larger percentage of coal can be taken from the area where the roof is good. It also gives a greater advantage to the miners, as at the International and Gowrie there is less sheering to do. An angle roadway is being driven South of the pit from the main level, through the old rooms and pillars to the face of the workings, to shorten the haulage. It will be noticed by the table of air that there is a greater quantity of air circulated through the workings than formerly. The cause of this is, that, as the workings of the Sterling pit are driven through to those of the Harbour pit, it makes a larger area, and consequently more air.

#### CALEDONIA.

I have inspected this mine eleven times during the year, viz.: March 4th, April 9th, May 3rd, May 4th, June 18th, July 11th, August 17th, September 12th, October 25th, November 4th, and December 5th. Work was carried on here during the season in the usual manner. Coal mined East and West in the rise workings, and some pillars taken from the rise on the East side of the shaft. There was also a large portion of the coal shipped taken from the dip slant. On my first visit in May I found the air very dull in the West high workings; to this I drew the attention of the Underground Manager, he promised to attend to it at once. I visited again on the following day and found that this matter was more satisfactory. At the face of some of the workings in the dip a quantity of fire damp has been given off. I am happy to report that Mr. MacKeen has taken steps to render the gas harmless, by enlarging his return overcast to give more air, and by putting up additional doors and stoppings in order to carry the air closer to the working faces. The rolling stock on the surface has been largely added to, in order to ensure more speedy shipment of the coal raised.

#### ONTARIO.

I visited this mine eleven times. Work here was carried on in a similar manner to that of 1886. The only difference was that the coal this season was mined on the low side of the high level rooms facing

towards the dip; however, this method did not last long, as it was found too steep for the horses to haul the coal up, and too expensive to keep the water out. Mr. McPherson has given a contract of cleaning the water level from the shore, with the expectation of gaining a working grip for next season above water level.

#### BLOCK HOUSE.

I have made several visits to this mine during the year. There has not been much mining done here this season. What little coal was shipped was mined from the pillars to the rise of the South slope and above tide level. Care was taken to secure and timber the old workings whilst extracting the pillars.

#### GOWRIE.

I have made thirteen official visits to this mine during the year. I visited it twice in July and once every other month. On all my visits I found it working in its usual systematic manner. The dip workings continue to give good satisfaction. A large section of pillars have been drawn from the rise workings. The West high levels and rooms were continued. At the face of the main West level a fault was struck over a year ago. However the level was continued on its course through the stone about seventy yards. At a distance of twenty yards from where the fault was struck a bore hole was put down, and the seam pierced thirty-six feet below the level floor. In the boring the coal appeared hard and firm, and something thicker than at the face of the fault. In conclusion, I enclose you table of air measured at the different mines on each of my visits; also, table of accidents, three of which, as you shall see, I am sorry to say proved fatal.

I remain, your obedient servant,

PATRICK NEVILLE,

*Deputy Inspector of Mines*

*Report of No. of Cubic feet of Air measured in Cape Breton Collieries during 1887.*

COLLIERIES.	January.	Feb.	March.	April.	May.	June.	July.	A ust.	Sept.	Oct.	Nov.	Dec.
Sydney Mines .....	.....	44,730	58,720	59,500	64,820	67,450	67,460	44,540	49,100	51,832	52,172	54,500
Victoria .....	31,180	33,180	26,460	31,500	28,000	21,000	28,140	27,510	26,960	35,400	39,600	45,684
Old Bridgeport .....	.....	.....	.....	6,000	7,650	3,520	5,080	5,500	5,000	5,420	.....	10,400
Reserve .....	28,900	29,000	30,000	22,800	36,557	28,080	28,100	31,000	30,000	35,040	40,600	43,000
International .....	.....	.....	.....	30,240	28,320	23,520	25,440	27,360	27,120	30,240	29,040	30,000
Little Glace Bay .....	.....	.....	10,000	15,840	12,960	23,520	23,525	16,380	22,266	20,000	47,460	45,000
Caledonia .....	.....	.....	25,000	24,500	14,000	25,590	39,270	39,696	38,250	40,000	39,989	40,950
Ontario .....	2,000	.....	.....	5,000	6,000	6,000	6,000	6,020	5,800	6,000	6,225	5,980
Block House .....	.....	.....	.....	.....	8,000	15,000	14,000	9,000	8,000	8,400	.....	10,000
Gowrie .....	25,000	28,630	28,500	35,380	36,000	27,880	33,500	40,200	30,000	40,000	38,000	35,685

*Report of Accidents in Mines in Cape Breton for the year 1887.*

Date.	Name of Mines.	Name.	Occupation.	REMARKS.
April 2....	Gowrie.....	John McPhail .....	Miner.....	Collar bone broken by fall of coal.
" 4....	Caledonia ....	John Morrison .....	do. ....	Leg broken by coal falling from face.
May 16....	Gowrie.....	Donald I. Fergusson..	Driver ....	Rib broken by fall of roof coal.
June 1....	Old Bridgeport	Henry Way .....	Miner.....	Head badly bruised by fall of coal in cros-cut.
July 11....	Gowrie.....	Murdock McDonald..	do. ....	Thigh broken by fall of coal from face.
" 27....	Caledonia ....	Neil J. McDonald....	do. ....	Back and hip injured by fall of roof coal.
Sept. 12 ..	Reserve .....	William Marsh.....	do. ....	Leg broken by fall of stone from roof.
" 21....	Sydney Mines..	Thomas Steele .....	Driver ....	Killed by fall of roof stone.
" " ....	do.	John Young.....	do. ....	Arm broken by fall of roof stone.
" " ....	do.	James Young .....	Miner.....	Chest injured by fall of roof stone.
" 28....	Reserve .....	John McNeil.....	do. ....	Fatal. By fall of coal from pillar.
Oct. 5....	Gowrie.....	John Fergusson ....	do. ....	do. By fall of roof coal.
" 25....	Caledonia ....	John McQuarrie ....	do. ....	Slightly burned by gas.
Nov. 10 ...	Sydney Mines..	Donald McInnis ....	Fireman ..	do. do.
Dec. 28....	Little Glace Bay	Hugh Gillis .....	Labourer ..	Leg broken by fall of coal from pillar.

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## GOLD.

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The returns show that 173,488 days labor were performed, 22,280 tons of quartz were crushed, yielding 21,211 ounces of gold during the year.

Although there is somewhat of a decrease in the gross amount of gold returned as compared to that of 1886, it is accounted for by the fact that the protracted drouth that commenced so early in the season prevented some of the regular mines from handling the usual amount of ore. The decrease in the amount handled by the older mines is more than double the total decrease of the whole industry, showing that the new properties have increased. There was a large amount of labor expended in developing new properties and re-opening old mines, putting a large amount of cash in circulation around the gold district. The expenditure of money for new machinery and mills was larger than for some years. The past year has been a profitable one, and there is a better feeling among gold miners as to the outlook of the industry for 1888. Exploring and prospecting, which were helped by the dry season, were largely entered into, and some promising discoveries were reported. Some systematic efforts have been made to handle low grade ores on a proper scale. As pointed out in former reports, these low grade properties are capable of supplying the bulk of the gold mining business. The expenditure of considerable sums of money on the roads to the mining districts has greatly benefitted the traffic at the mines, and made the transportation of machinery and heavy freight much easier.

### GUYSBOROUGH COUNTY.

*Stormont.*—There has not been much done in this district except prospecting for new leads. Considerable interest was awakened by the discovery of a lead on Hurricane Island, in Isaac's Harbor, that showed rich quartz.

*Wine Harbor.*—Attention is being drawn to the leads of this district that formerly did well. The mill on the property of Judge Henry has been taken down and is being rebuilt on a new site. The property will likely be re-opened during the coming season, and may lead to the re-opening of the adjoining properties. This district is one of the few that have facilities for landing coal from vessels close to the mines.

*Sherbrooke.*—The work in this district has been on the low grade properties; 2,191 tons have been crushed, yielding 452 ounces, 18 pennyweights. The mills that have been running are the Miners, Goldenville, Pactolus, Melrose, Crow's Nest and Cumming. The

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scarcity of water caused a stoppage of work during the summer months. During the latter part of the year Jas. H. McDonald worked a considerable quantity of low grade ore from property of his own. John Williams & Co. worked on the Palmerston, New York and Hayden properties. Some work was done on the Dominion and Canada Co.'s properties. Mining work to a limited extent was carried on at different points in Goldenville by Messrs. McLean, Fraser, McKay, Purcell, Jack, and others. R. P. Fraser worked the Crow's Nest for a short time.

It is to be hoped that the efforts that have been made to develop the large bodies of low grade ore in the district will be successful, and low grade mining become as large and profitable an industry as the amount of ore to be seen in the district seems to warrant.

#### HALIFAX COUNTY.

*Waverly.*—This district shows favorable signs of being brought up again as a gold producer. Messrs. Wilson and Gue have been working on the American Hill, at the Old Dominion lead, and at the Taylor lead, for the purpose of testing the ore near the old workings, and opening up new portions of the leads. They have met with a good measure of success. It is expected that the DeWolf and Burkner properties will be re-opened next season.

*Oldham.*—J. E. Hardman has been carrying on the works on the Mayflower and Dunbrack leads. He bought out E. C. McDonnell, and is now carrying on the McDonnell works with his own. Some tributing has been done on areas in different parts of the district. This district has always given good returns for the money invested in it, and there is a large amount of ore untouched near at hand, giving promise of a good return. The returns show 2,599 oz. from 2,357 tons of quartz.

*Lake Catcha District, Oxford Mines.*—During the year the Oxford Company have worked steadily on the Battery leads, which, though very small, averaging only about one inch in thickness, have proved remarkably rich in coarse gold.

The Split lead has been re-discovered, and preparations are now being made to work it again. In July an angular was cut on the property, which gave handsome returns for the first few tons, but the gold did not extend to any depth. The mine yield during the year was 3,050 ozs. from 886 tons of crushing material, of which less than one-fourth was gold bearing ore. Total returns to date being 10,613 ozs. from 7,401 tons of ore.

Some prospecting has been done on adjoining properties, but nothing of note has been accomplished.

*Tangier.*—Strawberry Hill mine has been working on tribute. The Essex Company mine was re-opened and worked for a time. Some prospecting was done in the district. The interest of the past season has been centered at Mooselands, 12 miles distant by road from



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old Tangier, and lying on the outskirts of the Tangier district, as originally proclaimed. Messrs. Dissoway, Murphy, Stemshorn, Irving, and others, took up areas on the Eastern side of the river at Moose-lands, and did a large amount of prospecting, resulting in the finding of several gold bearing leads of fair size and looking well. Irving and others have been tributing on the Humber property, principally on the Irving Furnace and Edwards leads, and in prospecting South of the mill found a new lead showing gold well. The road from Tangier has had a considerable amount of money expended on it by the Government, making it much improved.

*Salmon River.*—The Dufferin mine has carried on a large and remunerative business during the season, keeping the 38 stamp mill going almost continuously; 10,602 tons of ore have been crushed, yielding 3,258 ounces of gold. The wire-rope system has continued to give satisfaction. The workings in the East mine have developed large bodies of ore, the lode having in two of the large slopes a width of 23 feet. In the West mine the lode is from three to six feet in width. The vein is actually in two parts, only one dip having shown in the original outcrop, but showing the two dips between 50 and 100 feet in depth. There appears to be practically an unlimited supply of ore on the property. The total returns from this mine since it was opened show 27,814 ounces from 55,483 tons of quartz.

*Fifteen Mile Stream.*—The Egerton Company, under the superintendence of Mr. May, have been doing a steady business during the season. The mill and hoisting works of James Hudson were burnt during the season, causing a stoppage of his mine. Prospecting was greatly helped by the dry season, and a large amount of work was done, a number of new leads having been found and opened. Discoveries of gold in boulders in different places within a few miles of this camp, led to a considerable amount of exploration. This camp is still at a disadvantage for want of a good road.

*Beaver Dam.*—Mr. Yeadon has been carrying on his work steadily, and is doing well. A large amount of the work at this camp has been prospecting and development.

*Killag.*—Messrs. Stuart and Dixon have been working during the season. A road from the Sheet Harbor road to the camp was built during the summer by the Government and the parties interested in the district.

*Lochaber.*—John H. Anderson was busy during the season on the property of the Lochaber Company, and opened up a number of leads showing gold. There are a large number of leads in this district, and of good sizes for working.

*Caribou, (Jennings).*—The Lake Lode Co. have been pushing their work with good results. A new shaft was opened some distance West of the old pit to afford convenience in handling the ore from the West slopes. A new boiler and some new machinery has been added



to enlarge the power at the mine. Robert Wright has been superintending the development of some of the flat leads in the vicinity of the old Heatherington property, and has raised good ore. The owners have put up steam hoisting gear, and intend to put up a mill.

*Caribou, (Moose River).*—This district is a steady producer, although the amount of gold is small during some months. The outlook now is very encouraging. Mining is being carried on in three properties by Messrs. Tonquoy, Bruce and McGregor, respectively. Mr. Tonquoy has opened up a body of good ore, working the South lead with two dips, the Serpent lead and the North lead in one mine. He has built a dam to secure water power, and is building a 15-stamp mill. Being satisfied with the tests of the alluvial on his areas he intends to work over some thousand tons in the mill. Wm. Bruce is working the South lead on the areas adjoining Mr. Tonquoy. Mr. McGregor is working leads on the Moose River Gold Mining Co.'s property. His pits are down on the dips from the principal anticlinal fold in the district. The Caribou district shows 1,861 ounces from 2,689 tons of ore.

Explorers and prospectors have reported the finding of gold in a great number of places throughout the county.

#### LUNENBURG COUNTY.

*Gold River.*—The Gold River Mining Co. built a 20-stamp mill, driven by water, at the junction of the Branch Brook and the river. Some low grade ore was crushed. The dry season closed down the work, as the crushing, hoisting and pumping is done by water power. Prospecting was very brisk, and the discoveries of several new leads were reported.

Large numbers of areas were taken up for prospecting throughout this county, and considerable exploration done at different places.

#### HANTS COUNTY.

*Renfrew.*—Work has been carried on throughout the season at the Empress mine. The main shaft is down about 280 feet, and the drifts of the bottom level are about 400 feet long. This mine is a fine example of overhead stoping, and there is a large amount of ore blocked out in the Foundation lead. From the bottom level a crosscut has been driven South to the Hay lead, finding the lead of good size with a good working "hulk," making the work easy and cheap. This ore will be hoisted to surface through the main shaft on the Foundation lead. This quartz yields well in the mill, and a small force of men can supply quartz to keep the mill running steadily. A new pump has been put in the main shaft. The owners of the mine contemplate building a new mill of 20 stamps, and making other improvements in the working of the property. The Free claim property was worked for a short time, but was bought by E. C. McDonnell and associates who contemplate re-opening during next season.

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*Rawdon.*—This district was one of the principal producers during the year. The properties known as the East and West mines, formerly owned by the McNaughton Co. and the Rawdon Co., were sold to an English Company. The McNaughton lead kept up in value, and has been steadily worked. The workings are down a little over 400 feet. A wide lead, giving four feet of ore, has been largely worked.

*Mount Uniacke.*—Several of the old properties, comprising a large number of areas, were bought by the British and Colonial Land Association, who are working them as low grade properties. They built a new 20-stamp crusher of the latest designs, with the best modern improvements. The mill also has sets of Frue Vanners for making concentrates, crackers, etc., and is driven by a fine Corliss engine.

Promising discoveries of gold-bearing lodes have been reported from several parts of this county; as South Uniacke and Central Rawdon.

#### QUEENS COUNTY.

*Brookfield.*—The Brookfield Mining Co. have been working steadily during the season, and getting good returns from the old lead. The new lead tested during the season is a low grade ore body, in some places 12 feet wide, and can be mined by hulking. To handle this ore will necessitate additional stamps.

*Whiteburn.*—This district has been a busy one from mining, prospecting and building. The success of the McGuire lead has stimulated the work on other properties. During the season three mines and three mills have been at work.

*Malaga.*—This new district has received a great deal of notice during the past season, and bids fair to become a large and important one. A large amount of money has been spent in developing different properties, and a road built to connect with the Brookfield road. A good number of promising leads are now in shape for regular mining work. It is expected to have a 20-stamp mill running by the early summer.

#### YARMOUTH COUNTY.

*Carlton.*—The Hale and Ross property was sold to Hatfield and Uhlman, of Carlton. The workings were carried down 100 feet deeper, and the slopes worked East to follow the good ore. Considerable prospecting was done in the district, and discoveries of gold-bearing leads reported.

*Kemptonville.*—The Cowan Company resumed work during the summer. They turned their power at the engine house to operate pumps and machinery to develop the rich leads in the swamp. They resumed work in the Cowan mine proper during the early winter. The Kempton Company were busy all the season developing their property. They had the misfortune to lose their crusher and engine-house and hoisting works during the fall by a fire.

## IRON.

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In Cape Breton County there was some work done on the iron ore bed at East Bay, owned by E. T. Moseley, Esq. It is proposed to continue the work next season, with a view to its export. There was also a little work done on the George's River iron deposits. Discoveries of iron ore are reported from other points in the Island of Cape Breton. In Pictou County, the extensive deposits of this mineral, tested a number of years ago, have remained unworked, except at Bridgeville, where the Messrs. Grant have mined 172 tons from a large outcrop of brown hematite. The ore, which is of excellent quality, was purchased by the Steel Company of Canada.

*Londonderry.*—At this mine work has been continued at the East and West mines. There were 43,360 tons of ore mined, and 80 tons of anknite quarried. The Company made 18,510 tons of coke at their mines, and 14,391 tons of limestone were taken from McDonald's quarry at Brookfield for fluxes. A summary of the labor employed at these mines will be found at the end of the report.

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## COPPER.

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There is little new to record under this head. The Eastern Development Company did some more work on their Coxheath property. A winze was sunk on the new North vein, which was proved to a considerable depth, and found to average eight feet. The cross cut on the 200 feet level was completed, and is 260 feet long; it showed three parallel veins of ore dipping North. A promising vein three feet wide is reported from Red Cape, Inverness County. A little prospecting was done on the copper ores owned by Mr. Eagar, and others at Pinkietown, Antigonish County. The present high prices of copper should afford a good opportunity for the Coxheath mine, as it appears to contain large ore bodies.

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## ANTIMONY.

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The Rawdon mines have continued working, and discoveries of new veins are reported.

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## MANGANESE.

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Mr. T. W. Stephens reports that 235 tons were mined by him at Tenny Cape. Small lots were taken from Cheverie, Maitland, etc. From Wolfville there were 385 tons exported, valued at \$2,233 per ton. At Pembroke there were — tons mined, and the Montreal Company extracted 40 tons from their Onslow mine. This Company expect to raise a much larger quantity next season. The values of the best ores run from 70 to 90 dollars a ton.

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## GYPSUM.

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The total exports of Gypsum were 116,346 tons, compared with 123,753 tons in 1886. The market for this mineral is sought in the United States, where it is principally used for top-dressing, and the better qualities are ground for architectural purposes. It is to be regretted that there is not in this province an establishment similar to that at Hillsboro, in New Brunswick, capable of meeting our requirements for ground and manufactured plaster. The removal of the duty imposed on the manufactured article imported into the United States would permit the establishment of an important industry here, which would represent many times the value of the crude article exported.

## THE MINES REGULATION ACT.

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The Mines Regulation Act (Chapter seven of the Revised Statutes), was based on the Legislation on Mines passed in England a short time previously, and embodies the regulations for the inspection of both coal and metalliferous mines in Great Britain. The English Act has a long and interesting history, and was the outcome of philanthropy as well as of the desire of the miner for greater protection against the dangers of his calling. It also curiously illustrates the evolution of the theory of State interference, a form of socialism at once the most alluring, as well as perhaps the least objectionable. Mr. Boyd's useful work on "Coal Mine Inspection," gives in detail the gradual steps leading to the Mines Regulation Act of 1872, and the important Act in amendment thereof, passed in England this year, forms a logical supplement.

The final emancipation of English colliers from a state of practical servitude was not effected until the year 1799. From that date until the year 1842 the few Statutes that referred to colliers were framed in the interests of the coal owners. The first step upwards was the measure introduced by the late Lord Shaftesbury, to prevent the employment of women and young children underground. The necessity for interference may be judged of from the fact that it was a general rule to set children of seven or eight years of age to work underground.

The recurrence of colliery explosions and the complaints of the miners, as well as the attempts made to repeal the bill, led quickly to the formation of a public opinion that more legislation was required, and the report of the Commissions in 1846 showed clearly that a third power should intervene between masters and men, that of inspection. However, when Mr. Duncombe in 1847 introduced a bill to prohibit the use of naked lights or gunpowder in places where fire-damp was known to exist, it was rejected.

Three years later the accumulation of facts proved irresistible, and the period of enquiry, petition and discussion had closed for a time, by the appointment of inspectors under the Act of 1850. This step, however, did not settle the matter, and the loss of 138 lives in three weeks by explosions led to the appointment of a Commission to enquire into pit accidents, their cause and prevention. The report made in 1854 led to much discussion, and the Act passed in 1855 began to define more clearly limits of safety not to be overstepped by colliery managers.

The Act, by allowing the special rules, and by permitting imprisonment for the men and fines only for the managers, aroused much

irritation among the colliers, which was to a great extent removed by amendments made in 1860, when the bill was made perpetual, having been introduced only as a five year bill ten years previously.

The insertion of a clause allowing the colliers to appoint check weighers did not satisfactorily effect the abolition of abuses in estimating the coal mined, and further agitation was started, leading to the formation in 1863 of the Miners' National Association. For several years after the passage of the Act the mines were fortunately spared any specially terrible explosions, but the year 1866 witnessed the Oaks and other serious accidents. The evidence taken before the Commission then appointed was strong on the subject of the unsatisfactory estimation of the miners' coal, the education of boys, shorter hours, and sub-inspectors. The report of the Commission made July, 1867, was a decided step in advance, by increasing the limit of employment for boys underground from ten to twelve years of age, restricting the truck system and the use of gunpowder, and recommending increased inspection.

The bill introduced in 1869 embodied nearly all the recommendations of the Commission, but it was not pushed as a Government measure. The coal owners suggested many amendments, but the workmen's delegates considered that it failed to remedy many evils they had long complained of. There was much discussion on the bill, and the pressure of important political matters led to the Government withdrawing it. After some unsuccessful attempts to reconcile the conflicting interests the bill was introduced again in 1872, with several important amendments relating to ventilation, explosives, weighing, certificated managers, daily inspection by mine officials, etc.; all tending to effect the safeguards desired by the men. The bill was bitterly opposed by the masters, and to avoid the anticipated struggle conferences were held representing the Government, the masters and the men. A fairly agreeable compromise was effected and a report presented by the Conference Committee, but when the bill came before the house again it was found that very few of the compromise amendments had been added. Finally, after much discussion, the present Act received the Royal assent August 10th, 1872.

The Act, which is familiar in Nova Scotia under its translation to our Statutes, was an immense step in advance, but predictions were soon heard that it did not go far enough, and that the changed conditions of coal mining required more positive legislation on the subject of blasting, ventilation, lights and discipline. The occurrence of several terrible explosions pointed out that the strict observance of the act did not completely fill the list of safeguards against disasters.

The act was adapted to mines of moderate depth, and not gaseous, and laid down regulations which, not excessively severe on "safe" mines, were inadequate to those which could be classified as dangerous.

The use of gunpowder was permitted under conditions not very clearly interpreted, and safety lamps were not called for except under



conditions which were naturally suggested to managers of ordinary intelligence. The attention of the mining world was drawn to the part played by dust in augmenting and extending the flame of explosions, and the success of continental safety lamp makers, in devising lights much less assailable by currents of inflammable gas than the familiar Davy and Clanny, showed the English miner that he had long been at a disadvantage in combatting the gas difficulty. The reliability of the barometer for predicting by any appreciable period of time the exudation of gas from the solid coal, where it was confined at great pressure, was successfully questioned. All these points, with others of a more social character relating to inspection, weighing, etc., led to the appointment of the last commission, which has given a valuable report, directly affecting the latest English legislation, and forming a monument of careful and patient investigation.

The new mines' regulation Act, as recently assented to, presents numerous departures which cannot all be discussed here. I may, however, briefly refer to a few innovations, interesting to those engaged in our coal mines. Section 19 provides that when two or more parts of a mine are worked separately, each part may be deemed a separate mine. This, if interpreted to mean distinct egress and ingress, and ventilation, should tend to promote greater facility for inspection by mine officials, and more efficient ventilation.

Unwittingly or otherwise, the Act follows the lead of our Legislature in requiring certificated under-managers. The system proposed here has not yet been fully launched. The board of examiners, although desirous of establishing a standard of competency, but slightly inferior to that required by the ordinary board examination in England, found that apart from the practical experience, which was good enough, there was a deficiency among the candidates in the grasp of the principles underlying its application. The proper compensation of the broad principles of pneumatics, hydraulics, etc., is an essential element in the qualifications of the superior officials of a coal mine, who are liable at any moment to be called upon to promptly solve difficulties which are foreign to their past experience, or present under a fresh and unrecognized form, obstacles they have already seen overcome.

Another section requires that where loss of life or serious personal injury has immediately resulted from an explosion or accident, the place where it occurred shall be left untouched for at least three days after sending the statutory notice of the accident, unless visited by the Inspector before the expiration of that period. But this is not required if compliance would increase or continue a danger, or would impede the working of the mine.

This enactment will, no doubt, lead to many important and valuable reports by inspectors. Those concerned in the charge of a mine naturally desire to have the traces of any accident speedily removed, and their bias is not to present to outside view evidence which may be construed unfavourably to their practice. Questions may be raised as

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to the meaning of the words "impede the working of the mine," but the interpretation in view of the aim of the section presumably would be to restrict it to the leading roads, air ways, inclines, etc., and not to apply it to working faces, etc.

Under the English Act any unfenced shaft, etc., which is within fifty yards of any road, etc., or on any open or unenclosed land, is deemed a public nuisance. Some such amendment would be found of advantage in our gold mining districts, where old shafts gape open in all directions; and power should be given to any local authority to compel attention to public safety.

Section 45 provides that whenever it appears necessary, a special investigation may be held into any accident or explosion, and, the persons constituting such court may summon witnesses, examine under oath, etc.

General rules 2 and 3 provide for dumb drifts, and for placing mechanical ventilators, so that they are insured from injury by an explosion. This arrangement would necessitate a change in the practice of placing blown down fans and ventilators of a similar class directly over shafts. Good mining practice has already pointed this out, and no interval of less than fifty yards from the mouth of a shaft can guarantee that ventilating machinery will not be injured. Under rule 8 another common sense provision is called for; that of not permitting the use of naked lights in cutting of coal in a return from a place where safety lamps are required. Rule 9 provides that whenever safety lamps are used they shall be of a pattern that may safely be carried against the ordinary air current of the mine. This provision sounds the death knell of the Davy lamp, familiar to the older generations of our colliers, and will lead to the speedy abandonment of lamps of the Clanny pattern. The Davy lamp, and its safer companion the "Geordie," coming after the days of candles, of fire balls, draft bags, etc., did good service, and in their turn have in great measure made way for the Clanny. This lamp has been largely used in Nova Scotia, and in the hands of an experienced man is safe, and affords good protection, but when served out to miners who are not trained to safety lamps, it is little safer than its predecessors. The Mueseler and Marsant lamps were, if I am correctly informed, first tried in Nova Scotia in the Acadia Colliery, and they are, I believe, about the best lamps procurable. Firemen object that they are not convenient for gas testing, but no safer or more satisfactory method of trying for gas can be found than one of these patent lamps, provided with a tube, and a small rubber bag, which squeezed empty by the hand is filled with the air, and the suspected mixture squeezed through the tube on to the flame of the lamp.

The shot firing clauses are made more stringent, and favor is shown toward explosives not capable of inflaming gas. As yet it does not appear that explosives have been produced absolutely incapable of igniting gas, and until some such explosive is found which can compete with gunpowder, it would almost appear that the precautions



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surrounding the use of the latter should not be released under any circumstances.

Among the various compounds which have for several years been before the public in connection with this matter, *Carbonite* appears to have received the strongest endorsement. At a recent meeting of German Mine Managers at Dortmund, it was stated that it had been frequently fired in air containing 7 to 8 per cent. of fire damp, and filled with the most inflammable coal dust that could be procured, and in no case had any explosion occurred. It was also stated that under similar conditions gunpowder, blasting gelatine, and the various nitro-glycerine compounds, invariably caused an explosion. It was pointed out that in the experiments referred to it was used in charges more than equivalent to the customary charges of gunpowder. Should practical working under the conditions which experience has shown to lead to explosions with gunpowder, prove these advantages to be well founded, a great step will have been laid for sweeping legislation in the protection of life and property. With such an explosive available, the use of gunpowder should be prohibited in all mines showing gas steadily, even in small quantities, and in all broken workings. The watering of dusty rooms is also enjoined under certain conditions.

Rule 22 enjoins that whenever the men are required to do their own timbering, the necessary materials shall be placed conveniently to the working places, and the distance apart of sprags is regulated.

Rule 39, however, is the most startling, and one that would provoke much discussion in Nova Scotia. It provides that no person not now employed as a coal cutter shall cut coal by himself at the face of the workings, until he has had two years experience of such work under the supervision of skilled workmen, or has been employed for that length of time at or about the face of the workings of a mine. This is a decided step back towards the old principle of apprenticeship. Such a term is one of reproach in this country, and associated usually with some poor boy, whose legal guardians deem the tender mercies of some hardworking man the best means of developing the petted youthful inmates of a public charity. There can be no doubt that an apprenticeship makes a man a thorough workman, albeit narrow minded and slow. This clause was much discussed, many representing the employers as saying that the earlier a boy entered the mine the better miner he became as he grew up, and that the schools diverted many into other paths of life more alluring than underground toil.

There can be no question that too often in this Province men are permitted to cut coal before they have acquired a proper knowledge of their occupation, and its enforced caution against gas, falls of coal of roof, slips, etc. I have no doubt that some such provision as this would reduce the number of accidents at the face in our mines, and tend to increase the number of steady and careful miners.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

No.	Lessee.	District.	Area Square Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay et al	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al	Tatamagouche .....	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E	.....	1
106	Burchell, G. L., et al	.....	1
95	Coxheath Mining Co	.....	1
104	McKenzie, H. R., et al	.....	1
94	McKenzie & McKim	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F	Gay's River .....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James	East River.....	1
43	"	" .....	1
Total area under lease.....			19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

No.	Lessee.	District.	Area Square Miles.
IRON.—(CONTINUED )			
CAPE BRETON COUNTY.			
86	Brookman, S., et al	N. Side East Bay	1
91	Brookman, S. L.	East Bay	1
93	Brookman, S., et al	" "	1
102	C. L. Ingraham	" "	1
103	A. McKenzie et al.	" "	1
92	Matheson, D., et al.	" "	1
84	Protheroe, Pryse	Cow Bay	1
16	Inverness C. I. & R. Co	Whycocomagh	1
Total area under lease			27½ square miles.

LIST OF COAL LEASES.

No.	Leasee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		CUMBERLAND CO.				
21	Bligh, James, et al .....	.....	1	.....	John Moffatt.....	River Hebert.
47	Boston C. M. Co. ....	.....	1	.....	Jas. Baird.....	Maccan.
54	Cumberland C. M. Co.....	Chignecto .....	4	Working.		
12	} Cumberland R'y & Coal Co.	.....	9	Working.	R. G. Leckie .. }	Springhill.
55		Springhill .....			W. Hall .....	
17				Working.	P. McNaughton..	Joggins.
	Joggins C. M. Association ..	Joggins .....	2	Working.		
	Joggins C. M. Co.....	.....	2			
5	Lawson C. M. Co. ....	Maccan .....	1			
51, 53	Milner, Christopher.....	.....	2			
1, 2, 3, 4	New York & Acadia Co.....	Scotia.....	4	Working.		Maccan.
	W. Patrick et al. ....	Patrick .....	1	Working.	W. Patrick.....	Maccan.
	Salt Springs Coal Co. ....	.....	1	.....	J. L. Hewson.....	Oxford.
16	Minudie M. & T. Co.....	.....	1	Working.	M. Dunlop.....	River Hebert.
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.)....	.....	5	.....	J. S. Hickman ..	Amherst.
9	Victoria Coal Mining Co.....	.....	2			
			39			

## LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		PICTOU CO.				
1	Acadia Coal Co.....	Fraser.....	1	Working.	H. S. Poole ....	Stellarton.
3	" .....	Acadia .....	1	"	J. Maxwell ....	Westville.
42	" .....	Pictou.....	4	.....		
	" .....	Vale .....	3	Working.	T. Turnbull.....	Vale Colliery.
23	" .....	Albion .....	4	Working.	{ J. Douglas .. } { J. Dunbar .. }	Albion Colliery.
10	Gray, B. G., et al .....	.....	1			
11	Haliburton, R. G., et al .....	.....	1			
13, 14	Intercolonial Coal Co .....	.....	2			
12	" .....	Drummond .....	1	Working.	Robert Simpson..	Westville.
6	Montreal & New Glasgow ..	.....	1			
24	Richey, M. H. ....	.....	1			
45	B. G. Gray.....	.....	2	Working.	Muir & Sons.....	New Glasgow.
			<u>22</u>			
		CAPE BRETON CO.				
3	Archibald, Blowers .....	Gowrie .....	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney. Cow Bay.
2	Archibald, Thomas D .....	" .....	1			
5, 28	C. Belloni .....	Blockhouse .....	2	Working.	R. Belloni .....	Cow Bay.
29	" (sea area).....	.....	1			

[illegible]

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
7, 12	Inverness C. I. & R. C.....	INVERNESS CO. ..... Port Hood ..... ..... Broad Cove .... ..... .....	2		Alex. Wright.....	Moncton.
13	McGregor, J. D.....		3			
4	Richey, M. H., et al.....		1			
11	Ross, W. J.....		1			
6	Ross, H. E., et al, (sea area)...		1			
10	Tremaine, E. D., (sea area)...		1			
			<u>9</u>			
		VICTORIA CO. New Campbellton Black Rock ....				
2	Kenny, T. E.....		3			
3, 4, 5	Ross, Wm.....		5			
			<u>8</u>			

Total area under lease.....190½ square miles.

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter .....	100,635	92,091	44,762	39,499	60,807	7,224	.....	.....	206,204	138,814
2nd Quarter .....	125,786	118,006	77,797	63,772	220,381	194,396	.....	.....	423,964	376,174
3rd Quarter .....	130,893	123,354	130,324	120,172	298,140	318,117	.....	.....	559,357	561,643
4th Quarter .....	142,158	131,697	132,023	115,591	207,032	195,705	100	60	481,313	443,053
Total .....	499,472	465,148	384,906	339,034	786,360	715,442	100	60	1,670,838	1,519,684
1886 .....	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885 .....	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884 .....	279,964	258,405	511,193	464,181	593,156	539,064	.....	.....	1,389,295	1,261,650



TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			Other Counties.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land Sales	25,509	31,727	33,910	100,332	66,916	...	2,965	4,586	...	60	...	...	128,866	103,229	33,910	266,005
Sea borne....	64	125	.....	15,267	4,547	....	160,373	20,857	2,226	.....	...	...	175,704	25,529	2,226	203,459
Nova Scotia, total....	25,573	31,852	33,910	115,599	71,463	....	163,338	25,443	.....	60	...	...	304,570	128,758	36,136	469,464
New Brunswick .....	26,620	21,659	82,026	22,236	3,506	....	30,012	452	.....	.....	...	...	78,868	25,617	82,026	186,511
Newfoundland .....	.....	.....	.....	730	.....	....	78,735	2,346	242	.....	...	...	79,465	2,346	242	82,053
P. E. Island .....	.....	.....	.....	8,598	20,205	....	14,836	6,976	.....	.....	...	...	23,434	27,181	.....	50,615
Quebec .....	3,751	22,697	175,673	92,300	3,010	....	279,935	49,294	24,198	.....	...	...	375,996	75,001	199,871	650,858
West Indies.....	.....	.....	.....	.....	.....	....	5,858	282	.....	.....	...	...	5,858	282	..	6,140
United States .....	105	5,670	35,612	602	767	....	1,851	29,285	.....	.....	...	...	2,558	35,722	35,612	73,892
Other Countries .....	.....	.....	.....	.....	18	....	133	.....	.....	.....	...	...	133	18	.....	151
Total.....	56,049	81,878	327,221	240,065	98,969	....	574,698	114,078	26,666	60	...	...	870,872	294,925	353,887	1,519,684
1886.....	70,102	91,188	254,976	268,386	100,640	....	450,335	87,510	50,346	183	...	...	789,006	279,368	305,322	1,373,666
1885.....	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	.....	...	...	778,378	247,676	228,456	1,254,510
1884:.....	155,999	102,406	.....	330,309	133,872	....	459,210	70,845	.....	.....	...	...	945,518	316,132	.....	1,261,650

## COAL.—SALES.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1887.	Year 1886.
Nova Scotia:						
Land Sales..	52,877	54,498	67,024	91,606	266,005	271,384
Sea borne ..	8,120	42,839	70,110	82,390	203,459	188,853
N. S.—Total ..	60,997	97,337	137,134	173,996	469,464	460,237
N. Brunswick ..	28,647	36,877	51,058	69,929	186,511	175,918
Newfoundland.	841	12,995	39,177	29,040	82,053	71,476
P. E. Island. ...	.....	10,717	23,151	16,747	50,615	49,168
Quebec .....	47,568	201,238	277,041	125,011	650,858	538,762
West Indies ..	761	1,347	1,434	2,598	6,140	11,364
United States ..	.....	15,663	32,648	25,581	73,892	66,003
Other countries	.....	.....	.....	151	151	738
Total ....	138,814	376,174	561,643	443,053	1,519,684	1,373,666
1886 ..	153,054	356,340	527,654	336,618	1,373,666	
1885 ..	125,351	309,513	510,787	308,859	1,254,510	

## COAL.—GENERAL STATEMENT.

1887.	Produce.	Sold.	Colliery Consumption.
1st Quarter ..... tons	206,204	138,814	31,243
2nd " ..... "	423,964	376,174	42,586
3rd " ..... "	559,357	561,643	80,389
4th " ..... "	481,313	443,053	35,559
Total .....	1,670,838	1,519,684	139,777
1886. ....	1,502,611	1,372,656	142,421
1885. ....	1,352,205	1,254,510	127,624

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1887.

MINES REPORT.

COLLIERIES.	Produce.	SALES.				COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.	Total.	Engines.	Workmen.
CUMBERLAND Co.:							
Chignecto.....	16,480	7,237	3,131	2,160	12,528	3,708	215
Joggins.....	16,649	10,415	2,971	.....	13,386	3,122	1,013
Lawson.....	120	90	10	.....	100	.....	.....
Patrick.....	.....	.....	.....	.....	.....	.....	.....
Spring Hill.....	466,223	38,307	75,766	325,061	439,134	21,363	5,718
PICOU Co.:							
Acadia.....	230,611	129,663	64,532	.....	194,195	34,558	4,154
Barton.....	325	150	11	.....	161	.....	.....
East River.....	1,145	1,200	515	.....	1,715	206	174
Intercolonial.....	152,825	109,052	33,911	.....	142,963	5,565	2,877
CAPE BRETON Co.:							
Blockhouse.....	7,676	7,522	.....	.....	7,522	.....	154
Bridgeport.....	19,265	16,688	1,326	.....	18,014	115	110
Caledonia.....	108,144	72,253	29,797	.....	102,090	1,494	1,259
Franklyn.....	5,422	4,219	1,203	.....	5,422	.....	.....
Glace Bay.....	79,516	66,778	8,864	.....	75,642	3,109	4,094
Gowrie.....	128,477	96,413	23,341	.....	119,754	2,968	1,601
International.....	109,404	58,712	18,403	25,370	102,485	2,009	2,994
Ontario.....	7,768	7,426	21	.....	7,447	276	125
Reserve.....	88,849	66,142	10,063	.....	76,205	5,957	3,573
Sydney.....	170,782	129,950	15,260	.....	145,210	15,618	7,772
Victoria.....	61,057	48,555	5,800	1,296	55,651	2,773	2,103
INVERNESS Co.:							
Mabou.....	100	60	.....	.....	60	.....	.....
Total.....	1,670,838	870,872	294,925	353,887	1,619,684	102,841	37,936

## COLLIERY CONSTRUCTION ACCOUNT, 1887.

## MINES REPORT.

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COLLIERIES.	Shafts.	Slopes.	Adits.	Machin- ery.	Colliery Buildings.	Dwellings	Surface Works.	Railways.	Wharves.	Pros- pecting.	Totals.
CUMBERLAND Co.											
Chignecto .....	.....	.....	\$ 200 00	.....	\$ 750 00	.....	.....	.....	.....	.....	.....
Joggins .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	\$ 950 00
Springhill .....	.....	\$ 981 00	.....	\$ 7600 00	2900 00	\$ 5259 00	\$ 2360 00	\$ 716 00	.....	.....	19815 00
Pictou Co.											
Acadia .....	.....	338 00	.....	721 00	187 00	.....	285 00	.....	.....	.....	1531 00
Intercolonial .....	.....	.....	.....	8367 00	584 00	.....	.....	.....	.....	\$ 329 00	9280 00
Barton .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East River .....	\$ 40 00	300 00	.....	200 00	150 00	.....	240 00	.....	.....	.....	930 00
CAPE BRETON Co.											
Bridgeport .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blockhouse .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia .....	.....	.....	1830 00	.....	.....	.....	.....	.....	.....	.....	1830 00
Fracklyn .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glace Bay .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gowrie .....	.....	.....	1156 00	.....	300 00	.....	.....	.....	.....	.....	1456 00
International .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario .....	.....	.....	85 00	.....	.....	.....	80 00	.....	\$ 33 00	.....	198 00
Reserve .....	.....	753 00	829 00	.....	137 00	70 00	.....	.....	.....	.....	1789 00
Sydney .....	.....	.....	.....	2062 00	.....	338 00	.....	.....	.....	.....	2400 00
Victoria .....	.....	1035 00	7478 00	.....	.....	.....	.....	.....	.....	.....	8513 00
INVERNESS Co.											
Mabou .....	.....	.....	.....	.....	.....	.....	34 00	.....	.....	.....	34 00
	\$ 40 00	\$ 3407 00	\$ 11579 00	\$ 18950 00	\$ 5008 00	\$ 5658 00	\$ 3007 00	\$ 716 00	\$ 33 00	\$ 329 00	\$ 48726 00

Statement of the Classes and Number of Men employed, etc., at each Colliery during the year ended December 31st, 1887.

MINES REPORT.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average num-ber of tons per Cutter.	Average tons per day per Cutter.	Average quan-tity raised per day.	HORSES.		PITS WORKED.
	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.						
CUMBERLAND Co.																				
Chignecto .....	20	9	5	8224	2	9	3	4289	...	...	...	...	48	12513	824	2.9	58	1	1	283
Joggins .....	32	7	8	8643	4	21	6	7103	4	...	...	283	82	16029	520	2.5	81	4	2	204
Springhill .....	506	237	142	248033	80	130	19	62651	9	10	...	5227	1133	315911	881	3.2	1622	17	60	275
Pictou Co.																				
Acadia .....	263	210	81	120362	66	133	20	62250	3	...	...	132	776	182764	876	5.2	1389	16	16	166
East River .....	5	1	...	1395	1	...	...	330	1	...	...	250	8	1975	229	1.1	5.6	...	...	201
Intercolonial .....	129	62	69	74486	32	56	9	30733	1	1	...	258	359	105487	1186	4.2	543	7	18	281
Barton .....	2	1	...	187	...	...	...	...	...	...	...	...	3	187	162	1.3	2.7	1	...	117
CAPE BRETON Co.																				
Block House .....	9	3	...	1646	8	...	...	1613	...	...	...	...	20	3259	852	5.2	47	2	3	163
Bridgeport. ....	19	...	2	6090	2	3	1	1671	...	...	...	...	27	7761	1013	5.6	107	2	3	179
Caledonia .....	115	10	32	30137	17	31	12	14579	4	...	...	1157	221	45873	590	3.2	940	7	20	183
Franccklyn .....	7	...	2	2315	...	...	1	274	...	...	...	...	10	2589	774	3.2	22	...	1	241
Glance Bay .....	101	9	15	21910	23	24	4	12737	...	...	...	...	176	34647	787	4.2	425	4	16	187
Gowrie .....	131	14	46	38674	21	52	19	22782	...	...	...	...	283	61456	980	5.6	738	9	40	174
International .....	109	29	33	13951	32	33	12	5931	...	...	...	...	248	19882	1003	(?) 9.4	1032(?)	6	25	106
Ontario .....	20	2	3	3827	3	2	1	1558	...	...	...	...	31	5385	388	2.6	52	4	2	147
Reserve .....	97	15	30	27395	17	18	5	9653	2	...	2	1361	186	38409	915	4.7	425	6	17	209
Sydney .....	230	40	108	91624	57	85	35	50583	7	...	1	2382	563	144589	712	3.0	708	11	42	241
Victoria .....	87	31	10	34880	7	38	7	16083	...	...	...	...	180	50963	701	2.3	240	4	5	296
INVERNESS Co.																				
Mabou .....	3	...	...	15	...	...	...	...	...	...	...	...	3	15	...	...	...	...	...	...
Total .....	1885	680	586	733824	372	635	154	304820	31	11	3	11050	4367	1049694	...	...	...	101	271	3653

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1869	257,485	\$1 25
1851	116,274	"	1870	168,180	"
1852	87,542	"	1871	165,431	"
1853	120,764	"	1872	154,092	75
1854	139,125	Free	1873	264,760	"
1855	103,222	"	1874	138,335	"
1856	126,152	"	1875	89,746	"
1857	123,335	"	1876	71,634	"
1858	186,743	"	1877	118,216	"
1859	122,720	"	1878	88,495	"
1860	149,289	"	1879	51,641	"
1861	204,457	"	1880	123,423	"
1862	192,612	"	1881	113,728	"
1863	282,775	"	1882	99,302	"
1864	347,594	"	1883	102,755	"
1865	465,194	"	1884	64,515	"
1866	404,252	"	1885	34,483	"
1867	338,492	\$1 25	1886	66,003	"
1868	228,132	"	1887	73,892	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.



GOLD—GENERAL STATEMENT FOR THE YEAR 1887.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended Dec. 31st, 1887.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Tons of Quartzes Crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.			
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.		
Caribou .....	3	7832	1	1	.....	2689	0	13	20	0	18	1861	9	22
Oldham .....	2	11606	1	.....	1	2357	1	2	1	2	10	2599	7	9
Renfrew .....	1	5098	2	.....	2	1234	0	12	3	0	17	750	4	14
Sherbrooke.....	4	9575	.....	.....	.....	2413	0	4	20	0	18	585	3	5
Stormont .....	2	2964	1	1	.....	663	0	8	20.7	1	5	293	15	22
Tangier .....	2	6319	2	2	.....	738	0	8	10	1	10	311	10	13
Uniacke .....	1	10503	3	3	.....	689	0	3	2	0	4	107	3	1
Salmon River.....	1	33774	1	.....	1	10602	0	6	3	0	9	3258	0	0
Brookfield .....	1	13075	1	.....	1	1691	0	16	18	1	3	1418	1	15
Whiteburn .....	2	7599	3	3	.....	1094	2	2	3	6	2	2305	12	13
Lake Catcha .....	2	12116	2	2	.....	601	4	18	18	7	5	2959	4	0
Rawdon .....	2	31560	1	1	.....	5302	0	13	5.5	1	7	3507	13	8
Fifteen Mile Stream..	1	4920	1	1	.....	829	0	9	15	1	5	398	5	0
Unproclaimed, &c....		16487	5	2	3	1378	0	12	10	1	9	856	6	16
Totals.....	29	173448	24	16	8	22280	Av.0	19	11	6	2	21211	17	18



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARIBOU.						OLDHAM.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January .....	...	.....	...	324	237	13	2	2	605	24	56	111	3	11
February .....	...	.....	...	365	151	10	15	2	706	28	64	158	17	0
March .....	...	.....	...	329	243	8	17	2	854	34	267	221	9	0
April .....	2	362	14	262	241	1	16	2	742	30	226	108	14	0
May.....	2	410	16	258	102	7	15	2	853	34	254	168	0	0
June .....	2	408	16	97	87	13	0	2	971	40	236	248	2	0
July .....	2	707	28	54	18	17	5	3	1116	45	203	137	4	0
August .....	2	617	24	91	55	8	15	3	872	35	.....	....	..	..
September .....	2	762	30	194	161	15	22	3	1066	42	294	367	17	0
October .....	4	1360	54	331	283	5	4	2	1201	48	220	552	0	22
November .....	4	1482	59	70	48	6	19	2	1298	52	245	311	0	0
December .....	4	1724	70	314	230	1	12	2	1322	53	292	215	0	0
Totals.....	3	7832	...	2689	1861	9	22	2	11606	....	2357	2599	7	9

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	REDFERN.						SHERRBROOK.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gm.	Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gm.
January .....	1	332	13	122	107	16	0		787	31	...	...	...	...
February .....	1	381	15	41	36	0	0		888	31	56	31	14	0
March .....	1	237	9	...	...	...	...		190	8	45	41	4	14
April .....	1	401	16	101	63	0	0		182	7	...	...	...	...
May .....	1	415	16	110	89	0	0		442	18	76	16	5	0
June .....	1	568	14	126	54	16	6		650	26	77	16	7	0
July .....	1	277	11	125	52	0	8		780	31	...	...	...	...
August .....	1	309	12	46	33	10	0		740	30	240	...	...	...
September .....	1	258	10	...	...	...	...		1092	43	637	124	19	0
October .....	1	700	28	327	209	14	0		1092	43	350	94	13	0
November .....	1	710	28	96	36	12	0		1274	51	555	142	15	0
December .....	1	710	28	140	67	16	0		1458	58	377	117	5	15
Totals .....	1	5008	...	1234	750	4	14	4	9575	...	2413	585	3	5

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.--(CONTINUED.)

MONTH.	STORMONT.						TANGIER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	1	102	4	288	92	5	15	...	...	...	25	16	17	12
February .....	1	90	4	50	21	8	15	1	128	5	...	...	...	...
March .....	1	79	3	42	10	5	0	2	261	10	24	36	0	0
April .....	2	168	6	48	15	5	0	2	670	26	30	12	4	12
May.....	2	228	9	13	5	17	12	2	517	21	18	8	1	0
June .....	2	360	10	20	20	7	0	2	1536	61	21	15	5	0
July .....	1	80	3	...	...	...	...	2	1483	55	124	46	4	6
August .....	2	532	21	11	13	18	0	2	1027	41	154	78	7	6
September .....	2	572	23	79	78	4	16	2	697	28	174	21	17	1
October .....	2	446	17	45	14	3	12	...	...	...	50	28	18	0
November .....	1	180	7	67	22	1	0	...	...	...	118	47	16	0
December .....	1	127	5	...	...	...	...	...	...	...	...	...	...	...
Totals.....	2	2964	...	663	293	15	22	2	6319	...	738	311	10	13

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNLACKE.							SALMON RIVER.						
	No. of Mines.	Days' Work.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Work.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	1	257	10	65	13	7	..	1	3076	123	827	262	..	..
February .....	1	240	9	61	12	11	..	1	3104	124	767	218	..	..
March .....	1	109	4	55	7	12	..	1	3032	121	1032	248	..	..
April .....	1	8	...	...	..	..	..	1	2998	119	844	264	..	..
May .....	1	403	16	...	..	..	..	1	3267	131	986	222	..	..
June .....	1	986	39	...	..	..	..	1	2976	119	864	157	..	..
July .....	1	1282	51	...	..	..	..	1	2886	114	910	222	..	..
August .....	1	1505	60	...	..	..	..	1	3044	121	915	353	..	..
September .....	1	1511	60	...	..	..	..	1	2914	116	910	319	..	..
October .....	1	1295	52	400	49	11	..	1	2174	87	800	255	..	..
November .....	1	1632	65	50	11	14	15	1	2160	86	825	321	..	..
December .....	1	1275	51	58	12	7	10	1	2153	86	922	417	..	..
Totals.....	1	10503	....	689	107	3	1	1	33774	....	10602	3258	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	BROOKFIELD.						WHITEBURN.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	1	1250	50	195	124	17	..	2	1103	44	35	124	0	0
February .....	1	965	39	277	204	13	..	2	832	33	129	243	6	0
March .....	1	901	36	187	223	17	..	2	820	33	94	236	5	5
April .....	1	1954	78	102	116	6	..	1	288	11	21	128	10	0
May.....	1	1919	76	155	111	3	15	1	294	11	20	111	3	15
June .....	1	2309	92	200	122	10	..	1	325	13	46	170	10	3
July .....	....	1341	53	90	89	16	..	1	956	38	57	183	10	3
August .....	....	1255	50	90	92	10	..	1	944	38	61	215	12	0
September .....	....	1181	47	200	144	18	..	1	929	37	39	148	17	0
October .....	....	.....	....	100	94	5	..	1	360	14	187	327	7	15
November .....	....	.....	....	95	93	6	..	1	378	....	277	193	8	20
December .....	....	.....	....	.....	....	..	..	1	370	....	128	223	2	0
Totals.....	1	13075	....	1691	1418	1	15	1	7599	....	1094	2305	12	13

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	LAKE CATCHA.							RAWDON.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January .....	2	741	30	49	355	14	..	2	3970	160	636	313	1	0
February .....	2	609	24	90	348	7	..	2	3569	142	130	276	3	5
March .....	1	786	31	101	368	10	..	2	4034	160	647	298	16	0
April .....	1	968	38	89	300	1	..	2	2773	111	375	289	3	15
May.....	2	1416	56	76	167	5	..	2	2780	111	387	313	2	0
June .....	1	1064	42	84	138	15	..	2	2836	113	450	390	9	6
July .....	1	1163	46	85	450	0	..	1	1403	56	383	314	3	15
August .....	1	1167	46	64	186	2	..	1	1410	56	350	346	19	0
September .....	1	1084	43	60	234	15	..	1	1400	55	417	234	18	0
October .....	2	1083	....	73	206	8	..	2	1765	71	475	272	4	0
November .....	2	996	....	61	191	5	..	2	2613	104	450	237	18	15
December .....	2	1039	....	69	112	2	..	2	3007	120	602	220	15	0
Totals.....	1	12116	....	601	2959	4	..	2	31560	....	5302	3507	13	8

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	FIFTEEN MILE STREAM.				UNPROCLAIMED, ETC.					
	No. of Mines.	Days' Labor.	.....	.....	.....	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Gr.
January.....	.....	.....	.....	.....	.....	284	11	187	142	0
February.....	.....	339	13	.....	.....	748	30	443	179	8
March.....	.....	707	28	.....	.....	865	34	96	96	0
April.....	.....	447	18	.....	.....	310	12	176	134	2
May.....	.....	349	14	80	42	422	16	204	204	0
June.....	.....	343	14	80	31	1709	70	34	33	0
July.....	.....	353	14	51	64	1607	64	58	14	18
August.....	.....	357	14	78	34	1669	67	14	26	0
September.....	.....	478	20	120	59	1837	73	242	63	19
October.....	.....	534	21	160	68	1851	74	.....	.....	..
November.....	.....	548	22	120	45	3125	125	26	6	17
December.....	.....	465	18	140	52	2060	80	.....	.....	..
Totals.....	1	4920	.....	829	398	16487	.....	1378	856	16

## GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273264	92	276
1864	20022	18	13	21434		18	16	252720	1 42	426
1865	25454	4	8	24423	1	0	20	212966	2 15	645
1866	25204	13	2	32161		15	2	211796	2 14	642
1867	27314	11	11	31386		17	9	218894	2 24	672
1868	20541	6	10	32262		12	17	241462	1 53	459
1869	17868	0	19	35147		10	4	210938	1 52	456
1870	19866	5	5	30829		12	21	173680	2 05	615
1871	19227	7	4	30791		12	11	162992	2 12	636
1872	13094	17	6	17093		15	7	112476	2 09	627
1873	11852	7	19	17708		13	9	93570	2 28	684
1874	9140	13	9	13844		13	5	77246	2 12	636
1875	11208	14	19	14810		15	4	91698	2 20	660
1876	15038	13	18	15490		15	13	111304	1 94	582
1877	16882	6	1	17369		19	10	123565	2 46	738
1878	12577	1	22	17990		13	23	110422	2 05	615
1879	13801	8	10	15936		17	8	92002	2 34	702
1880	13234	0	4	14037		18	20	103826	2 18	654
1881	10756	13	2	15556		12	20	126308	1 52	456
1882	14107	3	20	22081		12	18	106884	2 37	711
1883	15446	9	23	25954		10	21	97733	2 84	862
1884	16059	18	17	25147		12	18	118087	2 40	720
1885	22203	12	20	28890		15	4	157421	2 53	759
1886	23362	5	13	29010		16	2	128880	3 25	975
1887	21211	17	18	22280		19	11	173448	2 20	660
Total	433754	6	22	576103	.....			3939942	.....	.....



MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

IRON ORE MINING.

Londonderry .....	Tons.	43,360
Springville .....		172
		<hr/> 43,532

AVERAGE FORCE EMPLOYED.

Skilled workmen :	No. of Men.	Days' Labor.
Under ground .....	64	17,371
Above ground .....	13	4,041
Unskilled workmen :		
Above ground .....	30	7,662
Under ground .....	53	12,902
	<hr/> 160	<hr/> 41,976

LIMESTONE.

	Tons.	Value.
St. Peter's, C. B. ....	5,681	\$4,000
Arichat, C. B. ....	4,000	3,000
Brookfield .....	14,391	.....
Londonderry (ankerite) .....	80	.....
	<hr/> 24,152	

BARYTES.

Henderson & Potts, } Brookfield. }	.....Tons.	400
Average employed daily for four months.....		6

GRINDSTONES, ETC.

Lower Cove, Cumberland Co., Messrs. A. Seaman & Co., }	.....	\$8387 00
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ANTIMONY ORE.

Rawdon Mine .....	Tons.	550
Average number of men employed above ground .....		20
"                    "            below            " .....		22

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**MOULDING SAND.**

	Tons.	Value.
Cheverie .....	160	\$800

---

**MANGANESE.**

	Tons.	Value.
Onslow Mine .....	40	\$ 2,800 (?)
Pembroke .....	25	1,750 (?)
Tenny Cape .....	235	16,450
Cornwallis .....	385	2,233
Cheverie .....	5	200
Maitland .....	1	60
	<hr/> 691	<hr/> \$23,493

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**GYPSUM.**

	Tons.	Value.
*Windsor .....	87,175	\$86,595
*Cheverie .....	23,870	17,840
*Walton .....	545	382
*Halifax .....	316	1,543
Arichat, C B. ....	340	275
St. Ann's, C. B. ....	4,100	4,000
	<hr/> 116,346	<hr/> \$110,635

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**\* BUILDING STONE.**

	Tons.	Value.
Amherst .....	4,906	\$24,285
Antigonish .....	28	112

---

\* Amount exported.

From the Annual Statistical Report of the Dominion of Canada issued by the Geological Survey, it appears that during the year 1887 there were 9,473 cubic yards of stone quarried in Nova Scotia, and valued at \$84,051.00. That 16,000 bushels of lime were burned, and that 7190 M. of brick were made at a valuation of \$50,630 00.

## INTERCOLONIAL RAILWAY.

*STATEMENT shewing number of tons of Coal received at the following Stations from Mines in Nova Scotia, for the Year ended 31st December, 1887.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax .....	39509	Petitcodiac .....	135
Dartmouth .....	5889	Penobsquis .....	1862
Bedford .....	498	Sussex .....	340
Windsor Junction ....	4253	Apohaqui .....	6
Wellington .....	53	Norton .....	50
Enfield .....	396	Bloomfield .....	10
Elmsdale .....	206	Hampton .....	521
Milford .....	54	Rothsay .....	121
Shubenacadie .....	200	Cold Brook .....	6599
Stewiacke .....	449	Saint John .....	43052
Brookfield .....	68	Berry's Mill .....	24
Truro .....	6034	Weldford .....	20
Valley .....	30	Kent Junction .....	404
West River .....	24	Chatham Junction ....	2063
Glengarry .....	18	Derby Junction .....	67
Hopewell .....	801	Newcastle .....	67
Stellarton .....	105	Gloucester Junction ..	592
New Glasgow .....	18592	Bathurst .....	54
Pictou Landing .....	67479	Petite Roche .....	17
Pictou .....	663	Jacquet River .....	18
Belmont .....	38	New Mills .....	6
Debert .....	30	Charlo .....	12
East Mines .....	24	Dalhousie Junction ....	145
Londonderry .....	65922	Campbellton .....	90
Wentworth .....	18	Metapedia .....	118
Greenville .....	24	Little Metis .....	6
Thomson .....	18	St. Octave .....	12
Oxford .....	300	Ste. Flavie .....	18
River Philip .....	31	Rimouski .....	12
Athol .....	12	St. Fabien .....	59
Maccan .....	25	Trois Pistoles .....	56
Nappan .....	72	Riviere du Loup .....	930
Amherst .....	5189	St. Alexandre .....	6
Aulac .....	268	St. Henri .....	16991
Sackville .....	2278	Chaudiere, (Local) ....	79099
Dorchester .....	786	do (West of) ..	75449
Memramcook .....	277	Levis .....	52
Painsec Junction .....	17	Pointe Levis .....	20431
Shediac .....	302	East. Extension Points.	2691
Point du Chene .....	67		
Moncton .....	17061	Total....	491420
Salisbury .....	1134		

From the following Stations :

STATIONS.	No. of Tons.
Maccan .....	11217
Spring Hill .....	304273
Stellarton .....	126150
New Glasgow .....	18039
Drummond .....	20111
Westville .....	2630
Total.....	491420

MONCTON, N. B., Feb. 15th, 1888.

INTERCOLONIAL RAILWAY.

Statement shewing the Quantities in Tons of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway during the Year 1887.

MONTH.	Spring Hill.			Acadia.				Drummond.		Chignecto.		Gowrie (round.)
	Round.	Run of Mine.	Slack	Round.	Run of Mine.	Slack	Nut.	Coke.	Round.	Run of Mine.	Slack	
January .....	24	8888	16	.....	2424	.....	.....	.....	.....	1805	.....	.....
February.....	1169	7772	48	.....	79	.....	.....	.....	21C	1390	6	.....
March .....	5118	7160	68	.....	.....	.....	.....	.....	417	2928	.....	.....
April .....	5496	6647	104	.....	.....	.....	.....	.....	256	3729	.....	.....
May.....	3176	5726	12	.....	.....	.....	.....	.....	224	1877	.....	.....
June .....	2139	6302	.....	.....	1035	.....	.....	.....	838	1021	.....	.....
July.....	1073	7122	12	.....	4582	25	.....	11	730	124	.....	.....
August .....	4811	5689	.....	4555	278	127	.....	10	1559	.....	.....	.....
September .....	2913	4765	48	4471	.....	88	.....	.....	872	.....	.....	309
October .....	2861	5680	.....	5161	.....	70	.....	12	789	.....	.....	1167
November .....	3539	4625	.....	7427	.....	60	.....	13	1400	3422	.....	.....
December .....	5233	6312	.....	5476	.....	28	11	.....	1522	3689	.....	.....
Totals.....	37552	76688	308	31841	8398	398	11	55	8823	19985	6	15
										96		1476

MONCTON, N. B., February 17th, 1888.

THE following shows the increase in coal traffic from the mines in Nova Scotia to the Upper Provinces, for the year ended 31st December:—

	Tons.
1879.....	570
1880.....	10,246
1881.....	30,629
1882.....	35,089
1883.....	54,891
1884.....	112,898
1885.....	165,791

### WINDSOR.

*Product of the Mine exported from the Port of Windsor and its outports during the year ended the 31st December, 1887.*

	Tons.	Value.
Gypsum, from Windsor .....	87,175	\$86,595
" " Cheverie .....	23,870	17,840
" " Walton .....	545	382
Total .....	111,590	\$104,817
Manganese, from Windsor .....	190	13,380
" " Cheverie .....	5	200
" " Maitland .....	1	60
Total .....	196	\$13,640
Moulding Sand, Cheverie .....	160	\$800
Total product of the Mine .....		<u>\$119,257</u>

HALIFAX.

*Summary Statement of Articles, the Produce of the Mine, exported from the Port of Halifax, for the year ending 31st December, 1887.*

ARTICLES.	The Produce of Canada.		Not the Produce of Canada.	
	Quantity.	Value.	Quantity.	Value.
Coal .....Tons.	15994	\$ 50997	3300	\$ 9072
Gold .....		321379		
Ores, all kinds .....		6420		
Gypsum, crude .....Tons.	316	1543		
Salt .....Bushels.			87655	13152
Slate .....		880		
Other Articles .....		79		
Oils, Coal, &c.....	281	68	2203	151
Total .....		\$381366		\$22375

The above oil does not include package value.







REPORT  
OF THE  
DEPARTMENT OF MINES,  
NOVA SCOTIA,  
FOR THE YEAR 1888.

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# DEPARTMENT OF MINES.

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## REPORT FOR THE YEAR 1888.

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*To His Honor the Hon. James McDonald, Administrator of the  
Government of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,

*Commissioner of Public Works and Mines.*

HALIFAX, March 2nd, 1889.



REPORT  
ON THE  
MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, Jr., A. M., F. G. S.,

(Fellow of the Royal Society of Canada, Etc.)

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, March 1st, 1889.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

*Commissioner of Public Works and Mines.*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending December 31st, 1888.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1888, compared with that of the previous year :

	1887.	1888.
Gold.....Ounces....	21,211	22,407
Iron Ore .....Tons.....	43,532	41,611
Manganese Ore ..... "	691	88
*Coal raised ..... "	1,670,838	1,776,128
*Coke made ..... "	28,748	29,808
†Gypsum . .... "	116,346	125,800
Barytes . .... "	400	1,100
†Grindstones, &c..... "	32,669†	17,225
†Moulding Sand..... "	160	169
†Antimony Ore..... "	400	308
Limestone ..... "	31,471	15,448

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

\* Ton of 2240 lbs.  
† Amount exported.  
‡ Value in dollars.



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In addition to detailed notices of the operation of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced not paying royalty to your Honorable Government.

I also beg to enclose the reports of Wm. Madden, Jr., Esq., Deputy Inspector for the Counties of Cumberland, Pictou and Colchester, and of P. Neville, Esq., Deputy Inspector for Cape Breton.

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## COAL TRADE.

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The total sales for the year 1888 amounted to 1,576,692 tons, against 1,519,684 tons in 1887.

As compared with the sales of the year 1887 the most noticeable points are:—

The home sales were 509,905 as compared with 469,464 tons in 1887.

The Province of Quebec took 678,321 tons against 650,858 tons in 1887, and 538,762 tons in 1886.

The sales to New Brunswick were 214,630 tons against 186,511 tons in 1887.

The sales to Newfoundland and Prince Edward Island show no change of importance.

The sales to the United States were 30,198 tons as compared with 73,892 tons during the year 1887. Of the amount sent to the United States last year 27,330 tons were slack, 183 tons were run of mine, and only 2,685 tons were round coal.

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## CUMBERLAND COUNTY.

The total sales of this county were 419,549 tons against 465,148 tons in 1887. This falling off was largely due to the heavy rains of last fall, which for a time overpowered the pumps of the Spring Hill Mines, the largest colliery. The total production of this mine was 406,195 tons compared with 466,223 tons in 1887.

The Joggins Railway, from Maccan Station on the Intercolonial Railway to the Joggins Mine on Chignecto Channel, has proved a valuable aid to the coal trade of the county. By this road the Joggins Mines are enabled to ship during the winter months, and their output, which was 16,649 tons in 1887, increased to 48,448 tons last year. The railway runs close to the outcrops of the seams of this district, and as the trade improves other mines will be opened.

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The Chignecto Colliery put out 14,807 tons, a decrease of about 1,500 tons. This, it is alleged, was also due to the difficulty experienced last fall in keeping the mine dry.

The home sales were 110,592 tons, compared with 91,335 tons during the preceding year.

The Province of New Brunswick took 140,576 against 130,305 tons in 1887.

The Province of Quebec took 182,927 tons, as compared with 202,121 tons during the preceding year.

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### PICTOU COUNTY.

The total sales were 418,893 tons, against 339,034 tons in 1887. It is gratifying to note an increase in the trade of this county, as for a number of years past its output had been steadily declining.

The home sales were 228,805 tons, against 193,062 tons in 1887.

The Province of Quebec took 114,382 tons, as compared with 95,310 tons during the preceding year.

The Acadia Company showed a production of 290,732 tons against 230,611 tons in 1887. The Intercolonial Company raised 158,668 tons against 152,825 tons during the preceding year.

During the past season the Black Diamond Coal Company, of New Glasgow, re-opened the old workings of the Nova Scotia Coal Company at Westville, and have extended them to the westward. At the close of the year preparations were being made to drive a stone drift to intersect an underlying seam, which the company propose to work if it prove of good quality. The output of this mine was 24,003 tons, principally, I believe, for local markets.

I append Mr. Madden's report on the operations at the various collieries in his district of Pictou and Cumberland Counties.

WESTVILLE, N. S.,

December 31st, 1888.

E. GILPIN, ESQ.,

*Inspector of Mines, &c.:*

DEAR SIR,—I have the honor to herewith submit you a condensed summary of my work as Deputy Inspector of Mines in the District of Pictou, Colchester and Cumberland, for the year ending December 31st, A. D. 1888.

INTERCOLONIAL COAL MINING COMPANY, WESTVILLE, PICTOU COUNTY.

*Slopes Nos. 1 and 2.*—A large amount of "pillar working" has been carried on during the year, a work that is attended in some sections of this mine with considerable danger, the coal being of a free,

open or "lipey" nature, and in addition to this, in May, what is practically called "a creep," occurred in the pillars of No. 2. However, all available means were employed and operations have been carried on successfully without any accident to life or limb, and a good per centage of coal has been won. In July I had occasion to test the per centage of gas. I used Livings' Gas Indicator, and at 1700 feet level in the return airway, found  $1\frac{1}{2}$  per cent., and in the return at the 2500 feet level, found  $2\frac{1}{4}$  per cent. The use of powder was promptly discontinued in these sections of the mine; in the latter part of the year, the levels in the lower lift were extended and back balances driven up. No powder used in any part of the mine.

#### SCOTT PIT.

Work to some extent, principally with a view to test the quality of the coal towards the deep, has been carried on during the year. In June they had reached a distance of about 500 feet to the deep of the shaft. The coal looked very well and improved as they proceeded. In November they ceased active operations in that direction, and had only two or three sets of men driving a travelling road and air return.

*No. 4 Slope (on same seam as Slopes Nos. 1 and 2).*—This slope was re-opened in March, and appeared in very good condition. Pillar work principally was carried on and successfully, a large per centage of coal being won. Air circulating in sufficient quantity round the working faces.

#### BLACK DIAMOND MINE, WESTVILLE.

As noticed in my last report, this is an old mine opened by a new company. In working this mine I am of opinion that too much care cannot be exercised to prevent a leakage of air into the old workings and *vice versa*, to prevent the damp exuding from the old workings into the airways. Work has been carried on regularly during the year and a considerable amount of coal obtained, and in general, for the number of men at work, I found the air satisfactory. In December operations were began at the 1400 feet level, with a view to test the underlying seam, by driving a level drift to it at an estimated length of about 500 feet. It having been impossible to travel the old workings, which occupy a large area, we deemed it wise to order the use of safety lamps throughout the mine, which order has been brought into effect.

#### ACADIA COAL COMPANY (LIMITED).

*McGregor Pit, Stellarton.*—The north side was made ready for operation at the early part of the year. The water taken out. Gas is evolved in considerable quantity in this pit. The air is kept well up to the working faces, and in consequence in any tests I subjected it to, I found it completely clear of gas and very satisfactory. In the lower lifts, four levels are being driven and worked with maul and wedge. No powder allowed to be used in this lift at all. In November, in company with the officials of the mine, I made a thorough

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inspection as to the per centage of gas in different portions of the mine. The maximum I could find was at a point in the return above the working faces, viz.,  $1\frac{1}{2}$  per cent. at one point in working face, on the east side I obtained 1 per cent., and the west side I found comparatively clear.

*Slopes Nos. 1 and 2, Douglas Seam.*—These slopes in the latter part of the year 1887 had been giving some anxiety in regard to the fire in the Cage Pit Seam, which overlies this Seam. On Sunday, January 15th, a serious explosion occurred in them, happily without any loss of life, and they, for a great portion of the year, have been closed to operations, so far as the output of coal is concerned. Vigorous work has been done cleaning out No. 2 Slope. Connection between it and No. 1 built off, and the Slope re-timbered. In a short time they will be in a position to carry on work as before. A new bank-house has been built and hoisting engines running. All connections between the workings and the cage pit have been built off.

*English Slope (Cage Pit Seam).*—Has been driven down this year on the Cage Pit Seam, to tap the coal east of the old workings of the Cage Pit. It is now down some 700 feet and still sinking.

*Acadia Slope, Westville.*—The working plant has been successfully transferred to the new lift at 3100 feet level. A good per centage of coal has been obtained from the preceding lift. Work in this mine still goes on in the usual good condition.

*Foord Pit, Stellarton.*—The work of extracting the water has been steadily continued. They are at the present time about 18 feet from the bottom of the shaft, and have the big pump at work assisting them.

*Vale Colliery (Thorburn).*—The McBean Seam workings have been driven down to a depth of 3,000 feet, and are in complete order. Telephonic communication has been established between the bank-head and the bottom, and found to work satisfactorily.

#### EAST RIVER AREA.

John Muir and Son are still at work on this area with a few men. During the season they sunk the slope about 100 feet to the dip and have turned off the levels. The coal still maintains a uniform appearance and of good quality.

*Haliburton Mine.*—Some little pillar work was done here in the month of February, but has remained closed for the subsequent portion of the year.

#### SPRING HILL MINES, CUMBERLAND CO.

Up until May 13th this Colliery worked in its usual splendid condition, when a fire, which fortunately is confined to a very small portion of the mine, broke out in the South slope. Steam at a pressure of 50 pounds to the inch was injected, with a view of extinguishing the fire.

It is not at present known if it is entirely out, but fortunately it is in a *waste* portion of the mine, and can never affect the working thereof at any time. This Company met with a large increase of water this year, and had to procure a larger pump to enable them to keep the works clear, which has been done. I have not found sufficient gas to make a reading on the indicators in the tests I made in the returns.

At 1,900 ft. East slope a new lift has been recently put in good order. A Bore hole about 5½ in. diameter, about 600 ft. deep, has been recently put down from the surface to strike the bottom of the North slope, with the idea of setting their machinery in position on the surface, and running the ropes through the bore hole for hoisting coal from the deep to the bottom of the slope. Also a tunnel has been driven from East slope through to North slope, some 400 feet, to shorten and facilitate underground haulage, and is also used to conduct the water to lodgements of North slope.

A new slope, No. 5, has been driven down on the "Eastern angle of the Basin" to a depth of some 600 feet, at which point the coal is 6 ft. thick and looks very well, and levels have been formed North and South.

#### JOGGINS.

Operations to some extent has been carried on during the year. A disturbed condition of the coal measures on West side of mine has somewhat impeded successful working, but the measures have resumed a uniform condition and promises well for next season's operations.

#### CHIGNECTO.

During the year the levels have been extended beyond the point in the water level where the coal took fire some years ago, and a rise place is at present being driven to surface. A new blow-down fan has been placed in position and give good results.

#### S. E. FREEMAN.

In early part of year a small force of men were employed, but on my visit in April I found the mine idle, and on August 20th I found them making repairs on the old Lawson mine, and until the close of the year they were busily occupied hoisting the water out.

#### WILLIAM PATRICK.

Excepting the first two or three months of the year has done very little work, and has been idle since May.

#### MINUDIE.

No extensive work done here during the year.

## BLIGH MINES.

This slope is now down about 130 feet, and they are turning away a level.

Pitch of Seam.....	53°
Coal.....	4 ft.
Band .....	1 ft.
Coal.....	2 ft.

I visited Acadia Iron Mines, (East Mine,) once during the year. operations were carried on satisfactorily. I also made an official inspection of a number of gold mines in the counties of Guysborough and Halifax. In general the work was conducted in good order with due regard to the safety of the men employed, but in some cases where work has been carried on by tribute to any extent, the timbering especially has been done in a superficial manner, the results of which has to be met by their successors. One of the most prominent examples is Salmon River Gold Mines, where recently a fall occurred owing to defective timbering that had been done in former years. Such work as is done under the present management is highly creditable to all parties concerned.

In conclusion, Sir, you say you do not require a tabular statement of pumps, &c., for this year, therefore, I have not inserted it, but would suggest that you make a slight increase of water to all the different collieries, especially Spring Hill, as this has been an exceptionally wet season.

I beg further to say that this year we have been very clear of serious accidents to employees, as with the exception of one, none were fatal. A record that I think is creditable upon looking at the number of men employed and the hazardous nature of their occupation.

I herewith append the usual tabulated statements, giving number of accidents and causes, volume air circulating, &c., &c.

I remain, your most obedient servant,

WILLIAM MADDEN, JR.,

*Deputy Inspector of Mines.*

*Volume of air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines—year 1888.*

	Jan.	Feb.	Mar.	April.	May.	June.	Nov.	Dec.	
Spring Hill Company.									
N. Slope.....	50,200	53,900	56,900	54,800	48,750	48,750	41,000	42,000	Three fans.
W. ".....	33,900	36,360	35,900	35,700	34,700	32,500	31,200	34,500	
E. ".....	39,000	40,000	39,700	38,900	36,500	38,000	53,700	51,800	
S. ".....	.....	Shut down.	.....	.....	.....	.....	.....	.....	Furnace.
No. 5 Slope.....	.....	.....	.....	.....	.....	.....	16,500	17,000	
Chignecto.....	.....	26,200	19,500	22,000	21,000	20,000	28,500	28,000	Blow-down fan.
Wm. Patrick.....	.....	.....	1,600	1,400	Idle	for	.....	.....	{ Nat. Ventilation.
Joggins.....	.....	22,100	21,420	20,750	21,200	25,000	19,700	22,000	Furnace.
S. E. Freeman.....	2,800	2,000	2,700	Idle	for	balanc	.....	.....	{ Nat. Ventilation.
Intervcolonial Coal Co.									
Drummond Slopes Nos. 1 and 2..	83,700	85,900	87,000	88,000	85,900	98,100	80,000	82,500	Ex. fan.
No. 4 Slope.....	.....	.....	.....	.....	.....	14,400	Idle.	16,700	Furnace.
Scott Pit.....	.....	.....	.....	.....	.....	22,100	"	22,000	Furnace.
Westville, Acadia Slope.....	61,000	60,000	64,000	72,000	55,200	41,600	65,200	.....	Ex. fan.
No. 1 Slope.. {	Jan 15	Closed	for	for	balance of	.....	.....	.....	Fan.
" 2 ".....	explosion.	.....	May	.....	began	.....	.....	.....	
McGregor Pit.....	77,820	82,990	74,624	75,942	73,800	61,000	85,000	91,600	Ex. fan.
Engliash Slope.....	.....	.....	.....	.....	Average	.....	.....	.....	Furnace.
Six Foot Seam.....	.....	20,000	24,000	12,300	33,600	31,900	Idle.	Idle.	Blow-down fan.
McBean Slope ..	40,000	39,500	39,000	42,000	37,000	36,500	.....	42,000	Ex. fan.
John Muir & Son, East River Area.....	2,000	2,300	2,000	Idle	Idle	Sinking until Sept	2,500	2,300	{ Nat. Ventilation.
Black Diamond, Westville.....	8,000	8,500	8,750	17,200	15,000	15,200	.....	14,850	Blow-down fan.

OFFICIAL VISITS, YEAR 1888.

MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Intercolonial } Slopes Nos. 1 and 2.....	4	2	3	10	2	4	7	6	3	6	5	7
Coal Co. } Scott Pit & No. 4 Slope ..	"	"	"	"	"	"	"	"	"	"	"	"
	7	6	5	9	3	13	6	7	4	3	6	20
	10	10	6	13	5	11	3	9	11	.....	2	4
Acadia Co., L'td. { McGregor Pit.....	Sep. 15	{	28	.....	28	9	3	8	7	.....	1	3
Nos. 1 & 2 Slopes }	13	8, 14	10	17	9	12	10	11	13	17	26	22
Douglas Seam..... }	30	{ 22	16	{ 23	22	20	19	22	.....	25	14	13
Vale .....	{ 25	{ 23	17	{ 24	23	21	20	23	.....	26	15	14
Spring Hill .....	.....	21	19	20	17	18	16	20	.....	24	12	17
Joggins .....	.....	21	20	21	18	19	18	21	.....	23	13	15
Chignecto .....	.....	20	19	19	Idle.	Idle.	Idle.	{ 20	.....	24	15	15
S. E. Freeman's Mine .....	.....	20	20	.....	Idle.	.....	.....	.....	.....	.....	.....	17
W. Patrick's Mine .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....
Bligh's Mine.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Haliburton Mine .....	30	8	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....
Minudie .....	.....	21	19	19	.....	Idle.	.....	.....	.....	.....	.....	.....
Black Diamond Mine .....	11	3	8	11	4	6	5, 11	.....	5	16	7	6
East River Area—John Muir & Son .....	12	8	.....	17	9	12	10	11	13	17	26	23
GOLD MINES—Isaac's Harbor .....	.....	.....	.....	.....	.....	.....	.....	.....	25	.....	.....	.....
Cochran Hill.....	.....	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	.....
Goldenville .....	.....	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	.....
Salmon River .....	.....	.....	.....	.....	.....	.....	.....	.....	27	.....	.....	.....
Beaver Dam .....	.....	.....	.....	.....	.....	.....	.....	.....	28	.....	.....	.....
Musquodoboit .....	.....	.....	.....	.....	.....	.....	.....	.....	29	.....	.....	.....



## LIST OF ACCIDENTS FOR YEAR 1888.

No.	Date.	Mine.	NAME.	Occupation.	REMARKS.
1	Jan'y. 28 ..	McBean Slope..	Wm.. Hyde.....	Shot-firer....	Premature shot (slightly injured).
2	Feb'y. 4 {	Drummond {	David Murray .....	Driver.....	Arm broken; while handling timbers.
3	" 24 ..	Spring Hill....	Archibald Ferguson ..	Miner .....	Collar bone broken. Fall from roof.
4	March 16 {	Drummond {	Thomas Quigly .....	Driver.....	Leg broken. Kicked by a horse.
5	" 23 ..	Vale .....	Angus McDonald .....	Bankman....	Leg broken. Overground. Gondola passed over him.
6	April 25 ..	Spring Hill....	Robert Niven.....	Miner .....	Leg and shoulder broken. Fall from working face.
7	" 27 ..	McGregor Pit..	Duncan McKenzie....	Miner ... {	Collar bone broken. Struck with cage while crossing the Back Balance.
8	" ..	Joggins .....	Ed. Smith .....	Bankman....	Two fingers taken of. Coupling cars on Bank-head.
9	May 15 ..	Spring Hill....	B. Smith .....	Miner .....	Slightly injured. Struck with cage.
10	Aug. 13 {	No. 1 Slope, {	Chas. Calder .....	Overground {	Leg broke. Undermining a piece of clay, which fell on him while filling a hole. Overground.
11	October 5 ..	Douglas Searn {	Wm. Foley.....	Laborer. {	Leg broken. Fall of coal from face.
12	" ..	Drummond....	James Reid.....	Miner .....	Foot smashed. Boxes run over it.
13	Nov. 5 ..	English Slope..	Alex. Cameron .....	Overground {	Fatally injured. Boiler, whilst being lowered to place, fell on him.
14	" 6 ..	Spring Hill....	John White .....	Laborer. {	Leg smashed (amputated). Fall from roof.
15	" 19 ..	" .....	Joseph Robertson ....	Miner .....	Leg broke. Fall of coal from working face.
16	Dec. 11 ..	Joggins .....	Michael Hennessy ....	Miner .....	Burned slightly. Gas.

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**CAPE BRETON COUNTY.**

The total sales for this county were 738,250 tons, against 715,442 tons in 1887.

The home sales were 190,508 tons, as compared with 188,781 tons during the preceding year.

New Brunswick took 31,739 tons, against 30,464 tons in 1887.

The sales to Quebec were 381,012 tons, compared with 329,229 tons in 1887.

The United States took 2,685 tons of round coal and 21,098 tons of slack coal, a slight decrease from the sales to that quarter during the preceding year.

During the past season the regular manufacture of Coke has been commenced at the Gowrie Mines on a small scale, and several hundreds of tons shipped. I am informed that it is largely used in copper concentration and smelting operations in Newfoundland. A large number of licenses to search have been taken out between the coal field as now opened and the Sydney Harbor; as yet, however, no returns have been made of any valuable discoveries. The output of the individual collieries remains much the same as in 1887, there being a decrease at the Reserve and Sydney Mines, and a notable increase at the Victoria Colliery.

I append the report and tables of Mr. Neville, Deputy Inspector for the Island of Cape Breton.

BRIDGEPORT, *Jan'y. 4th, 1889.*

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave to submit you the following report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1888, which I trust will meet your approval.

**SYDNEY MINES.**

I made twelve official visits to this mine during the year. There has been very little water pumped from the submerged district during the past year, as the head of water in one column was found too heavy for the present appliances. However, a new pump is now ready for work and the water will be delivered from one pump to the other.

One hundred and fifty yards south from the pit bottom a new angle dip is been driven eastwardly in order to gain grip and take the place of the coal in the south levels. In my report for 1887, I mentioned that salt water had been observed coming through the roof

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in the south levels, those levels have been driven on this season, a bore hole fifteen feet in length being kept in advance of them. It was found to be quite dry until they had driven a distance of two chains, when the salt water was again observed coming through the roof. It was then decided to cease driving in this direction. A dam has been built in this level and a one inch pipe placed from it to the lodgment at the pit bottom; this pipe answers two purposes, one to keep the water from wetting the roads, the other to ascertain at any time at the pit bottom how much water the leak would be making without visiting the dam. About the same time that the salt water was observed in the levels it was also found coming through the roof in one or two rooms south and east to the dip of this, those rooms were immediately stopped. However in a month after it was found that the water had dried up and has left the place safe so far. Salt water has also been found to be coming through the roof in the headways that were driven towards the rise in the Franklin area. The management thought it prudent to stop driving any further. A dam has also been placed in this and a pipe connecting it with the lower one. On my visit there on the 10th of November, I saw the water timed and measured at the out end of the pipe, the quantity from both was one gallon in twenty-three seconds, which is about the average run.

I am happy to report a great improvement on the south engine plane. In many places where it was narrow it has been made to a width of three feet clear from the rails to the wall, the intention is to have it all made this width. There has also been lights placed on the head of the trips. The entrance to the manholes on the engine planes have been white washed, so that they are readily discernable by those travelling them.

#### VICTORIA MINES.

I visited regularly every month and found it always working steadily. The east slope has been driven down to the level on the low lift. The levels have been extended on the east and west sides of the slopes and balances driven up. A section of pillars have been split and drawn out of the high lift on the east side. On some of my visits last winter I noticed that the slopes were in a very dangerous condition with ice, and these roads the men generally travelled on. The centre slope where there was no ice, was the return air course, and the wind in this was too strong for the men to carry lights in. This was brought to the notice of the management, and a travelling road was made on the east side of the east slope and across to the centre slope, and two stationary lights placed there which gave better satisfaction. A better arrangement is now in operation, at a distance of about a half mile from the mouths of the slopes to the east and west on the crop of the coal, two shafts are sunk for the purpose of air inlets and travelling roads. Eighteen dwelling houses have been built and ten more are in course of construction, the latter have three acres of land attached to each. There has also been built new stables and a new locomotive shed capable of containing two locomotives. 5,500 feet of cast iron pipe have been laid from Livingstone lake to the reservoir. There has also been added one new boiler thirty feet in

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length and six feet diameter. A new thirty-eight ton locomotive is in readiness for work; this locomotive was built and finished at Sydney Mines.

#### OLD BRIDGEPORT.

I made several official visits to this mine and found it working satisfactorily. The cupola, referred to in my last report, has been finished and a furnace built at the bottom of it, which gives ample air for the present, a greater column than is shown on the table can be had if required. A few pillars have been extracted from the rise. In the lower and leading rooms as they extend towards the south, the rock overhead between the two seams is getting thin. In some places it has fallen and is not more than ten or twelve inches, it is expected that when about one hundred feet more is driven that the two seams will be together.

#### RESERVE.

I have made twelve visits here during 1888. The principal operations have chiefly been done in the French slope; about two-thirds of the mining has been taken out of this slope, and the remainder from the main or west slope, one-half of which was mined in the rise pillars. A new furnace has been built at the bottom of the west cupola. The drawing of the pillars let an extra amount of water in the mine, but the pumps proved equal to it. It is hoped that a new and larger furnace will be built at the bottom of the east cupola. Mr. Routledge says that it is the intention to drive down the French slopes five or six chains further this winter.

#### INTERNATIONAL MINES

Were inspected by me eleven times during the past year, and found to be working satisfactory. No. three section has been stopped, as the rooms have reached the barrier towards the sea-shore. About the last of July one of the wide rooms in number seven section fell in, causing a heavy run of water, amounting to fifty-two gallons per minute; it still continues to run at the same rate. The rooms in that section of the mine have again been changed to their original width of eighteen feet, and the pillars left from eight to ten feet thick. On the surface in the machine shop, the following new machinery has been added: One 62-inch brake lathe, one shaper, one wheel press, two emery wheels and stand, one shop engine, twenty-five horse-power, and one power hammer for the forge, all of the latest improvement.

#### LITTLE GLACE BAY.

I visited this colliery eleven times during the year. The south levels has been drawn ahead from where the coal was soft and wet, and rooms broken off and worked. As they advanced the coal resumed its former character; the roof also got hard and firm. The rooms have chiefly all been changed from eighteen to twenty-four feet wide. At a distance of about eight chains from the pit bottom on the north side, a short distance to the rise of the level, some of the old rooms fell in and caused an extra quantity of water to get through, which kept

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the pumps working eighteen out of the twenty-four hours. The run is not as great now as it has been. However, it has one good effect, the great run of water that was in the shaft is nearly all dried up. On the surface there has been considerable improvements made. The miners' houses have all been repaired. A new bank trestle-work is being built; a new circular saw has been put up, and a new locomotive of the latest improved patent (Baldwin & Co., of Philadelphia, builders,) have been placed on the track, and gives good satisfaction.

#### CALEDONIA

was visited by me once each month during the year. The operations at this mine are of the usual character. The coal is drawn from both sides of the dip slant and from the pillars on the east rise, and also from the west and high lifts. The ventilation has been considerably improved. A long line of stoppings have been put up from the west level along the high lift. A new pump has been placed at the bottom of the dip slant, which delivers the water to the upper lodgement. There has also been a change made in the lifting pumps. The pump that has been stationed halfway up the pump-shaft is now placed at the bottom of it with the other one. They discharge in two separate eight-inch columns to the surface; the rods work on the outside of the pipe, instead of the inside, as formerly; a brass rod connected passes through a stuffing box and connects with the bucket in the pumps. This is a decided improvement, as it saves, to a great extent, the wear of the pipe and rods from friction, also the latter from impure water.

#### ONTARIO.

This mine I have paid several visits, and may state that it is worked in the usual style without much improvements. The levels were cleaned out last winter with the expectation of gaining a working grip towards the face and above the upper level, but proved unsatisfactory. The faces of the old rooms on the south side of the slope were then cleaned out and roads put in. From those rooms the quantity of coal that was shipped was mined. However great care was taken to have the place well timbered as the roof was very bad, it being so near the cropping.

#### BLOCK HOUSE.

I have visited this colliery several times during the past year. The mining has been very limited the past season, chiefly all the coal that has been shipped was extracted from the pillars that separated the slope from the Dawson pit to the wharf. Operations were commenced on them at and around the Dawson pit bottom and were drawn outward until within one hundred yards of the slope mouth. The slope has settled down out to that point. The rails were taken up and removed out to the wharf.

#### GOWRIE.

At this mine work has been progressing in the usual way, pillars drawn from the high lift and rooms continued. The levels have been extended on both sides of the dip slant and rooms broken off and

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worked. Nothing has been done in the main level since the coal was proved at the north side of the trouble. A new pump has been placed at the bottom of the dip slant and a column of six inch pipe delivering the water to the main level. A new eighteen ton locomotive has been placed on the track and is giving good satisfaction. There has also been twelve new coke ovens built and are kept working steady, turning out a large quantity of excellent coke.

I visited the Ross area at Cape Mabou on the 12th of March, and found a man named John Rankin getting coal out of a seam in the side of the cliff, about three-fourths of a mile east of this, at a place called McPhee Point. I also found a man named Angus Beaton getting coal out of the cliff. This seam dipped forward at an angle of about seventy-five degrees and varied in thickness from three to six feet. The coal taken out was sold and used around there for home consumption.

TERMINAL CITY, CARIBOU COVE,

I visited on the 17th of October, and found three men working in a seam of coal above tide level. The seam at that point was about eleven feet thick. Westwardly from this, about six hundred feet distance and twenty feet north of the crop, a shaft was being sunk twelve by six feet, and sunk about forty feet deep. I learned while there that it was the intention to sink it four hundred feet, and if the seam was not struck at that depth to tunnel from the bottom of the shaft into it. There were also men preparing and clearing a place to sink a shaft on what they called the seven feet seam. This is to be sunk six hundred feet. One or two small buildings were partly finished and another in course of construction. Mr. Page is the manager there.

I enclose you table of air measured by me on my visits to the different mines; table of visits, and also table of accidents, which, as you will observe, I am happy to state is not as fatal as in former years, and that all the injured have completely recovered.

I remain, your obedient servant,

PATRICK NEVILLE,

*Deputy Inspector of Mines.*

REPORT OF CUBIC FEET OF AIR MEASURED IN CAPE BRETON IN 1888.

NAME OF MINES.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines.....	69,884	68,580	70,500	.....	59,500	58,720	51,500	65,280	58,836	59,420	50,610	50,200
Victoria .....	36,520	35,000	33,000	40,920	41,000	39,060	30,000	36,800	40,320	44,352	49,332	48,000
Old Bridgeport .....	.....	.....	6,600	8,000	15,000	16,500	17,000	.....	20,200	17,010	25,000	15,000
International .....	.....	.....	30,720	30,720	31,926	26,400	28,320	26,360	27,840	31,920	.....	15,000
Reserve .....	.....	35,000	30,000	33,700	35,880	42,900	40,000	22,550	37,080	31,920	43,900	40,000
Little Glace Bay .....	.....	20,000	15,540	16,800	17,000	30,284	24,000	25,000	11,440	17,320	15,000	28,000
Caledonia.....	20,000	25,000	28,600	30,920	31,580	45,800	44,235	53,690	46,410	53,880	56,580	50,000
Ontario .....	.....	.....	.....	5,000	5,000	6,000	6,040	8,000	5,000	11,760	12,000	9,000
Block House .....	.....	10,000	.....	20,920	.....	9,000	5,000	8,000	9,000	10,000	6,000	9,000
Gowrie .....	.....	25,000	29,464	22,156	30,000	38,700	43,500	40,100	43,260	57,440	35,000	20,000



DATE OF OFFICIAL INSPECTIONS FOR 1888.

NAME OF MINES.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines	31	11	15	.....	8	23	11	10	22	13	10	4
"	.....	.....	.....	.....	22	.....	.....	.....	.....	.....	.....	.....
Victoria	27	7	24	23	17	27	28	11	12	4	8	10
Old Bridgeport	.....	.....	19	10	28	20	31	.....	14	25	26	19
International	.....	.....	7	11	14	15	25	17	17	25	23	1
"	.....	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reserve	.....	28	8	12	15	15	21	18	20	19	23	7
"	.....	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Glace Bay	.....	17	9	12	26	19	25	30	19	9	17	17
Caledonia	26	6	7	20	12	25	4	1	13	23	19	13
Ontario	.....	.....	.....	25	16	26	19	22	10	8	21	11
Block House	5	14	3	14	19	6	17	13	14	5	12	18
"	9	27	6	.....	.....	7	30	20	18	6	.....	.....
"	13	.....	22	.....	.....	8	26	23	20	.....	.....	.....
"	.....	.....	.....	.....	.....	9	19	24	21	.....	.....	.....
"	.....	.....	.....	.....	.....	11	.....	.....	.....	.....	.....	.....
"	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....
"	.....	.....	.....	.....	.....	13	.....	.....	.....	.....	.....	.....
"	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....	.....
Gowrie	.....	11	20	26	11	18	16	21	8	26	28	6
"	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Terminal City, Caribou Cove	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mabou	.....	.....	12	.....	.....	.....	.....	.....	.....	17	.....	.....



## REPORT OF ACCIDENTS IN MINES IN CAPE BRETON FOR THE YEAR 1888.

DATE.	NAME OF MINES.	NAME.	OCCUPATION.	REMARKS.
March 7..	International.....	Stephen McCormack..	Driver ....	Slightly burned by fire damp.
" "	" .....	Peter McMullin.....	" .....	"
April 19..	Gowrie .....	Edmund Lewis .....	" .....	Leg broken between coal-box and prop.
" 23..	Sydney Mines .....	George Buchanan .....	Miner ...	Leg broken by fall of coal from junk.
" 26..	Reserve .....	Michael McNeil.....	Driver ....	Jammed between two coal-boxes.
May 21..	Sydney Mines .....	Nell McKinnon.....	Miner ....	Fatal. Run over by trip on engine plane.
" "	" .....	John McLennan ....	" .....	Injured on head and arms by trip on engine plane
June 12..	Reserve .....	Neil Mackie .....	Driver ....	Shin bone broken by coal-box.
" 29..	Sydney Mines .....	Frank Gleeson .....	Timber man.	Injured on back by fall of stone from roof.
" "	" .....	Roderick McIntosh ..	Miner .....	" by fall of coal.
Sept. 13..	Block House .....	John McMullin .....	" .....	Two ribs broken by fall of stone from roof.
" 15..	International.....	Michael McNeil.....	Bank boy {	Squeezed between empty box and wall by full trip running on empty road.
" "	Gowrie .....	Alexander Nicholson..	Miner ....	Shoulder dislocated by fall of stone from roof.
Oct. 9..	Victoria .....	Thomas Reed.....	" .. {	Slightly injured on head and arms by shot blowing through from the opposite room.
" "	" .....	Malcolm McIntosh ..	" .....	Do., Do.
Dec. 21..	" .....	Joseph Jefferson ..	Brake Tender.	Leg broken between rope and drum on balance.

## COAL — MISCELLANEOUS.

During the past year some prospecting was done on the Hollywell Grant coals, in Antigonish County. Reports of coal discoveries have been received from Gay's River, Colchester County, and from Parrsboro' and vicinity, in Cumberland County. At Oxford, in the same county, near the railway station, Mr. McCarty did some prospecting. He reports having bored through three seams of coal from 2 to 6 feet thick. Preparations are being made to give these deposits a thorough test. Should the coal beds prove adapted for regular mining, they are very advantageously situated, as the Intercolonial Railway runs through the district.

In view of the attention recently given to coal miners' insurance, the following information may be of interest. Some years ago it was pointed out that; under the most favoring conditions of air and diet, that coal miners were not among the most unhealthy classes of men; and it is believed that wherever the ventilation clauses of the Mines Act are strictly enforced, the health of all employed underground is materially improved. On this subject, Professor Benton remarks:—

"The reports of H. M. inspectors of mines give valuable information respecting the accidental mining mortality, but they contain no reference to the mortality from diseases contracted by mining. Where does mining rank in occupational mortality? What are the prevalent diseases amongst miners? What are the causes of these diseases? One of the earliest writers on the subject was Dr. Ramazzini, of Modena, who wrote about the middle of last century. From the last census report the following table has been taken, which shows the mean death rate of miners per 1,000 living. The classes of mines in which they have worked are indicated by the localities:—

	1860-1-71. Year of age.		1880-1-2. Year of age.	
	25 to 45.	45 to 65.	25 to 45.	45 to 65.
All males .....	11·27	23·98	10·16	25·27
Occupied males .....	.....	.....	9·71	24·63
Farmers .....	7·66	17·32	6·09	16·53
MINERS (coal):				
Derbyshire and Nottingham .....	.....	.....	6·54	20·23
West Riding of Yorkshire .....	.....	.....	6·59	21·80
Durham and Northumberland .....	.....	.....	7·79	24·04
Lancashire .....	.....	.....	7·91	26·30
Staffordshire .....	11·33	30·45	7·81	26·50
South Wales and Monmouth .....	14·72	29·66	9·05	30·87
Average of these six districts .....	.....	.....	7·64	25·11
MINERS (ironstone):				
North Riding and other ironstone districts .....	.....	.....	8·05	21·85
MINERS (slate quarry) .....	10·88	28·67	9·95	31·04
MINERS (metal):				
Cornwall. ....	11·94	41·73	14·77	53·69

The mining mortality in these districts increases in the tabulated order, except that of the ironstone districts. It shows that the death rate of colliers is below that of all males in Great Britain, and that it is very little above the mean death rate of occupied males; in fact, if the accidental mortality be deducted, the natural mortality of colliers stands very little above the mortality of the healthiest occupation—namely, that of farming. In making such comparisons it must be remembered that colliers have a physical constitution higher than the average. The table further shows that the mining mortality in Staffordshire has fallen, though still is high. To what is this reduction due? Obviously, partly to the decline in the accidental mortality of the district, and probably partly to such other causes as the eight-hour labor system, restriction in the age of young persons employed, and improved ventilation. It appears the mining mortality of South Wales is higher than that of any other district, and that amongst the older colliers it is increasing. These circumstances may not be referable entirely to mining; they may be the result of density of population; imperfect sanitation, the character of the soil, meteorology, &c. The Registrar-General has pointed out that the mortality is higher in densely-populated mining towns than in densely-populated towns of other industries. Turning next to the vital diseases of miners, the last census report points out many of their peculiarities, amongst which are the following:—

*Table showing the Number of Deaths from Diseases of the Respiratory Organs, and Phthisis per 1,000 Deaths, exclusive of Accidents.*

	Phthisis.	Diseases of the respiratory organs.
Derbyshire and Nottinghamshire .....	206	241
West Riding of Yorkshire .....	181	281
Durham and Northumberland .....	200	180
Lancashire .....	170	313
Staffordshire .....	134	343
South Wales and Monmouth .....	194	344
North Riding of Yorkshire .....	224	328
Slate quarry men .....	316	281
Cornwall .....	400	265

The mortality of our colliers from phthisis is 43 per cent. below the average of the kingdom. In this respect English experience resembles that in the colliery districts of Belgium and Upper Silesia. Similarly our colliers suffer little from diseases of the nervous system. They, however, fall under diseases of the respiratory organs in greater numbers than any other class of diseases, and in this their mortality is considerably above the average of England and Wales, and above that of most industries. The metal miner seems to suffer rather less than the collier from this class of diseases, but phthisis rages amongst them. On the other hand the Cornish mines have a praiseworthy low accidental mortality, placing in this respect coal mines far in the rear.

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Proceeding to the causes of these peculiarities of miners' diseases, has the floating dust of the mine any reference thereto? It is remarkable that the mortality amongst colliers, slate quarry men, and metal miners increases in the order of the hardness of the minerals of these mines. The last census report points out that dusty trades become injurious as the dust thereof increases in hardness. Colliery dust ranks amongst the softest, and probably this may account for the low mortality amongst colliers. But as our mines become more dusty by reason of their greater depth, the mining mortality may be increased. Further, has the heat of the mine any connection with mining mortality? Some mines have attained a depth so great that their natural heat is nearly that of the blood. Such mines, of course, have a corresponding increased barometric pressure amounting to an additional pressure on the body of, perhaps, 30 cwt."

The following experiment may be noticed as a praiseworthy attempt to alleviate the sufferings and sickness which often follow the accidents of miners. It is condensed from a notice of a paper by the President of the Lehigh Coal Company, read before the Institute of American Mining Engineers in 1884—and discusses the annual report for the year 1887.

The basis of the fund is, generally speaking, as follows:—A monthly contribution of one-half of one per cent. of his earnings by each outside workman, and of one per cent of his earnings by each inside workman, the contribution by any workman being limited to one dollar per month. The company agreed to contribute to this fund one cent for every ton of coal that should be produced at its mines. Each contributing workman accidentally injured when actually engaged in the service of the company, was to be entitled to a sum equal to one-half the weekly wages of the class of workmen to which he belonged, for each week of his disability; but the benefits in case of accidental disability were limited to six months for any one accident. In case of death, thirty dollars was to be paid for funeral expenses, and a sum equal to one-half the weekly wages was to be paid for one year from the date of the accident. This plan was based on a careful examination of such data as were obtainable in regard to accidents occurring at the mines in the anthracite region, and the contributions were fixed at what seemed to be an entirely adequate sum for the purpose, the expectation being that a surplus would accumulate which might after a time permit the benefits to be increased.

We have now before us a statement of the Lansford Beneficial Fund of the Lehigh Coal and Navigation Company for the year 1887, being the fourth year during which this plan of relief has been in operation.

In the four years from 1884 to 1887, inclusive, the employes have paid into this fund \$36,734.62, and have drawn from it in benefits \$55,288.88, and the fund has to its credit \$19,429.15, of which \$10,000 is invested in interest-bearing securities. There are no expenses charged to this fund, except those of the examining surgeon and the small expenses of printing; and these are more than met by the

interest which the fund receives. Of course, it is an immense advantage to the beneficiaries under this plan that they are wholly rid of the costs of soliciting business and expenses and commissions which belong to any of the accident-insurance companies. Moreover, they receive also the benefit of the large contribution made by their employers, which exceeds that made by themselves.

The fund has accumulated money during each year of its existence, and through the last four months of the year 1887, when on account of the strike in the Lehigh region, contributions fell off greatly, its cash balance diminished less than \$500. Of course, such funds are liable to heavy calls in case of any great disaster; but the company feels that, with an accumulated capital of nearly \$20,000, the fund is strong enough to warrant an increase in benefits. Experience has shown that it is not wise to make the benefits in cases of accident more than one-half the weekly wages, as many cases have occurred in the past of men submitting to slight injuries, in order to get upon the rolls of the relief-fund, where the fund paid a larger rate of benefits; while to increase the sum allowed for funeral expenses would often simply lead to an extravagant display at funerals and confer no benefit on the family. No such objection, of course, can be made against increased benefits in case of death, and upon the statement for 1887, the announcement is made that the death-benefits, which have heretofore been paid for twelve months, will hereafter be paid for eighteen months.

On this subject Mr. G. G. André, writing to the *Colliery Guardian*, remarks:

On a former occasion, when combatting the notion prevalent in this country that the material state of Continental miners is greatly inferior to that of our own, I mentioned the fact that in France almost every colliery has its system of relief funds whereby the working miner is rendered exempt from the suffering attending a state of destitution in cases of sickness, accident or old age. As the question has been brought to the front again by the proposed new French law relating to these funds, and as, moreover, it is receiving some attention in England, I will give briefly the particulars for one mine as an example of these mutual relief societies. Contributions to the *laisse de secours*, or relief fund, of the Courrières Colliery is obligatory upon all, and the participants number at the present time about 3,200. Every miner pays into the fund once a fortnight, that is, on each payday, a sum proportional to his wages as follows:—Those earning 3 fr. a day (a franc is 9½d.) and upwards pay 1.50 fr.; those earning from 2.50 to 3 fr. pay 1 fr.; and those who receive less than 2.50 fr. pay 0.75 fr. This payment gives to each contributor a right (1) to relief in cases of accident or sickness; (2) to funeral expenses in case of death; (3) to a retiring pension, or annuity, after a certain age; and (4) to a share in the annual division of the residue after all payments have been made. Relief is given according to the following scale:—Those earning 3.50 fr. a day and upwards receive 1.50 fr. a day; those earning from 2.50 to 3.50 fr. receive 1 franc.; those earning from 1.60 to 2.50 fr. receive 0.75 fr.; and those earning less than 1.60 fr., that is,

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children under fifteen, receive 0.50. This is the rate for cases of sickness ; for cases of accident the rate is 25 per cent. higher. To this the mine-owners add a sum of money amounting to  $2\frac{1}{2}$  per cent. of the wages paid, for medical attendance and other assistance to the families of the men. All fines exacted for infringement of rules are paid into a fund for the benefit of the women during the period of confinement.

It will be seen from the foregoing account that the French collier has something to fall back upon in case of need, and something also to look forward to for his old age. This gives him a position of independence that tends powerfully to raise his social status and to promote his happiness by removing that ever-gnawing anxiety which the prospect of utter destitution in case of inability to work must always occasion. If the Bill become law, as it probably will, the payments into the relief funds, rendered uniform and compulsory, will be nearly the double of those indicated, and, of course, the degree of relief afforded will be proportionally increased.

In my report for the year 1884, I gave some useful information about pit ropes. It is questionable, if at more than a few of our mines there is that degree of attention paid to the ropes that they are entitled to. The daily examinations are too often of a perfunctory and superficial character, and length of service becomes more of a guide as to the strength of a rope than any critical and practical test.

The following memo. of the way this important matter is regarded at a German colliery, may interest some of our mine managers.

At the Carlsglück colliery near Dortmund, the ropes of steel,  $1\frac{1}{4}$  inches diameter, weigh 3 pounds per foot. Each of the 126 wires which compose them has a strength of 992 pounds when new, and it will stand from 14 to 17 flexions through an angle of 180 degrees, when held in a vise with jaws rounded to a radius of  $\frac{1}{4}$  inch. About 13 feet of the rope is cut off every month and the wires tested. It is found that they increase somewhat in tensile strength, the average breaking strain being 1008 pounds, but they will endure only six or seven flexions. When they will break with five flexions the rope is changed.

The effect of the acid water in our own coal mines in rendering steel wire brittle has long been recognized, but German experience would indicate that the shock, or vibration, caused by suddenly lifting the load, and which is naturally most severe near the end of the rope attached to the cage, greatly and rapidly affects its elastic limit, a point which may have a much wider application than to colliery ropes, for it may apply to various structures in steel which are subject to heavy shocks or vibrations.

A German paper, in an article on the present methods of rope manufacture from hemp, and the determination of the different qualities and probable strength simply from the appearance, lays down the following rules:—A good rope is hard but pliant, yellowish or greenish grey in colour, with a certain silvery or pearly lustre. A dark or



blackish colour indicates that the hemp suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibres were damp, and is consequently weak and soft in those places. Again, sometimes a rope is made with inferior hemp on the inside, covered with yarns of good material—a fraud, however, which may be detected by dissecting a portion of the rope, or, in practised hands, by its behaviour in use. Other inferior ropes are made from short fibres, or with strands of unequal length or unevenly spun—the rope in the first place appearing woolly, on account of ends of fibre projecting, and in the latter case the irregularity of manufacture is evident on inspection by any good judge. A very simple and extremely ready means exists for ascertaining the purity or otherwise of Manila hemp rope. This consists in forming balls of loose fibre of the ropes to be tested, and burning them completely to ashes. While pure Manila hemp burns to a dull greyish black ash, Sisal leaves a whitish grey ash, combinations of Manila and Sisal yielding a mixed ash resembling the beard of a man turning from black to grey.

Among the numerous new types of steel and iron ropes brought before the public, the Lang locked wire rope is said to have given good satisfaction. In it the wires are so moulded as, when put together, to make practically a homogeneous flexible rope. From ropes that have been in use numerous samples of this patent can be selected which have stood twice as long as the ordinary rope under similar conditions of wear and tear.

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## GOLD.

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The total returns under this head show that 36,178 tons of quartz yielded 22,407 ounces of gold for 163,772 days' labor, compared with 21,211 ounces of gold from 22,280 tons of quartz for 173,418 days' labor in 1887. In my last report a very dry season was given as a reason for the gold yield not being larger. This year, if the result is to be sought for in natural causes, the blame is to be laid on the wetness of the summer of 1888.

There were five districts yielding between 2,000 and 3,500 ounces, viz.: Salmon River, Caribou, Lake Catcha, Whiteburn, and Stormont. The average yield for all the quartz crushed was 15 dwts. 21 grains. Taking 10 dwts. as the dividing line between high and low grade ores, it appears that 25,165 tons yielded 9,011 ounces or an average of 7.1 dwts. Of the remaining districts, the highest average was 2 oz. 3 dwt. 8 grains from the Whiteburn district. I am informed that a profit can be made from the lowest returned average of the year's work, viz., about 4 dwts. The returns of the Salmon River mine for the past year show that an average of 6 to 7 dwts. even on a medium scale of operations can yield good returns.

It is to be regretted that I have to note the dismantlement of the fine milling plant, built by Fraser and Chalmers, for Mount Uniacke, a few years ago. I understand that this mill was put up to work low grade ore ground. I am myself a believer in the future dependence of our gold mining on the low grade ores, but have never yet seen a low grade ore mining enterprise established on a firm and lasting basis, when the supply of ore was looked for in broken ground. If I might venture to put in words my idea of how a low grade ore property should be put on the market as a business speculation for investors, I would say that it should comprise a block of ground ample in size, that at least six separate and distinct tests of 250 tons each should be made over the property, and there would then be some guarantee of permanency, and a fair criterion of value. I believe, from my visits to various districts, that there exists at many points large bodies of low grade ores, running from  $2\frac{1}{2}$  to 4 dwts. to the ton, which could be profitably handled. But such enterprises not presenting the allurements of the lotteries of rich veins, they should be carefully selected, and thoroughly tested before systematic work is commenced.

During the past season I have had the assistance of Mr. F. W. Christie in inspecting the western mines, and of Mr. Wm. Madden, Jr., Deputy Inspector, who visited the principal mines east of Halifax. Mr. Christie reports as follows on the Queen's County mines:—

### QUEEN'S COUNTY.

Gold mining has been vigorously prosecuted in the districts in the northern part of the county. Most of the work has been confined to



regular mines in Brookfield, Malaga Barrens and Whiteburn districts. Prospecting, which is always interesting to the people of new districts, has been greatly hindered by the exceptionally wet season that has continued since the spring. Very few new discoveries have been reported. Despite some failures, mining business has materially improved, and has caused an improvement in general trade of the county. Considerable interest in these districts has been awakened by the enquiries of outside capitalists looking for mining investment. Good care is shewn in the underground workings and in timbering, and although a great many unskilled men are employed, very few accidents have occurred.

*Brookfield.*—Work in this district was resumed after the discovery of the "Dunbrack" vein. This vein partakes of the character of a true fissure vein in intersecting the county rock instead of conforming to it, as the leads in this county do in general. The quartz or pay ore had a width in a good part of the mine of from twelve to fifteen inches, and some months gave returns of five (?) ounces per ton. The property was bought by the Philadelphia Mining Company, who have put up shaft houses and built a tramway to the Brookfield Company's mill, which they leased. Prospecting was gone into to some extent, but was retarded by the very wet season.

*Malaga Barrens.*—Business in this district has been very brisk during the past year. A large number of buildings of all kinds have been put up. The population of the mines has increased to nearly 400 people. A new road of six miles in length has been built from the mines to Chelsea Settlement in Lunenburg County, making the distance between the mines and Bridgewater about twenty miles. Another piece of road about a mile and a half in length connects the road to Chelsea with LaBelle, giving a shorter route to Liverpool and Port Medway. A small steamer was run on Ponhook Lake, from points on the lake to the mines, thus affording extra accommodation for passenger travel and freight traffic. The Malaga Company have been operating three mines on their properties, and twenty stamps in the crusher. Development work has been vigorously pushed in the three mines, and they are well equipped. The Parker-Douglas Company have reopened their property, and are mining on two veins shewing abundance of good ore. The company have built a crusher and a number of buildings for carrying on the business of the mines on their property. They have put in a plant for supplying compressed air to drills in sinking shafts and driving tunnels. They have also bought a large number of areas lying east of their first property, and purpose to work them during the coming season. The Minneapolis and Malaga Mining Company did a large amount of development work on the veins on their property, and built a 20-stamp mill, but on account of the unsatisfactory nature of the yields from their ore tests, they contemplate a stoppage of the work.

*Whiteburn.*—This district, the oldest in the county, continues to be a steady producer, and the coming year is looked for with confidence, as regards gold mining and the business dependent on it. The McGuire property, under the able and successful management of

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Mr. Roderick McLeod, who has been superintendent so long, continues to send in good returns. There are two veins being worked on the property—the old vein and another similar vein a short distance south. On the old vein the underground workings have been carried easterly, and the quantity of quartz in the vein has increased. A straight shaft was put down successfully to intersect the vein where trouble was feared from the brook. The quantity of ore in reach of the shafts on the two veins justified the expectation of a successful season in the coming year. Indications of other veins on the property have been found, and they will be developed as needed. Mr. Graves, the manager of the property adjoining on the north, put down a straight shaft and intersected the McGuire north vein on his property and worked it for a time. A fire burned down his shaft-house, and work was suspended at this pit. Mr. Graves opened pits on different veins on the property, and carried on mining during the season. The Cushing property has not been working during the past year, but negotiations have been in progress for the purchase of the property, and a resumption of work is hoped for. The finding of some veins, shewing gold well, in the neighborhood of Corrigan Lake, have been reported, but the rainy weather prevented the carrying on of development work.

*Other places.*—Reports of discoveries and prospecting were made from different parts of the county, as West Caledonia, Westfield, Lake Rosignol, Greenfield, Broad River, &c.

The returns show that there were 22,625 days' labor performed, 4,518 oz 14 dwts. 6 grs. of gold extracted, and \$5,694.00 paid for rights and royalties.

In Yarmouth County there is nothing new to report.

In Lunenburg County prospecting was carried on extensively at several points, but not much active mining performed. There were a few lots crushed by the Millipsigate Company. In the fall a good deal of attention was directed towards the eastern end of this district.

In Hants County, the Rawdon United Mining Company made returns up to August, principally from Lease 254, when their mill was destroyed by fire.

The Northup - Dimock Company, of Central Rawdon, began milling in August, and up to the end of the year had returned 835 ounces from 375 tons of quartz, etc. The lead here runs across the strata, and considerable amounts of the surface rock are rich enough to warrant crushing.

At Mount Uniacke proper there was no work of any note performed during the year.

At South Uniacke, the Withrow property has become of importance, as it has been proved to contain a valuable lead, the returns running as high as 4 oz., 14 dwts. to the ton. It is expected that next season this district will be further prospected.

At Ardoise last fall a large amount of ground was taken up. The Harding Company have put themselves in a position to commence regular mining, and the holders of property to the west of them have found several gold-bearing veins. The ground is reported as being regular, and as the gold bearing boulders are from several points, it is hoped that this locality will soon come to the front.

In Renfrew mining operations have been continued without any special feature of interest. The returns show 642 ounces, from 1,145 tons of quartz.

At Waverley but little has been done in the way of milling, as the attention of those engaged here has been directed to extensive preparation for systematic mining. The McClure mill has been rebuilt, and Mr. Nelson has been preparing to open a large tract of ground east of the mill, which is known to contain several important leads. On the east side of the Canal Lake a tunnel has been started at a few feet above water level, to cut the barrel quartz, or its westerly dip north of the bridge. There were a few tons from the Wallace areas crushed at the Burkner mill. The returns showed 4,132 days' labor.

*Oldham.*—The return show that 15,570 days' labor were performed, and 1,699 ounces extracted from 2,106 tons of quartz. The maximum yield of any return being 1 oz. 9 dwt. 22 grs. Operations were confined principally to the mines under Mr. Hardman's control.

*Carribou.*—The Lake Lode Company continued working steadily, their lode averaging up to three feet of quartz. The Caffrey property has been opened by the same Company, and returns made from Lease 217. In the Moose River diggings tributors continued working in the Montreal and other properties, and were continued on Mr. Bruce's property.

Mr. Touquoy continued opening his property. He has built a good mill, in which in addition to the quartz mined, he has crushed a large amount of surface soil, etc.

The completion of the through road from Tangier to Mooseland, and thence to Copes Hill, Moose River, etc., and the Musquodoboit Valley, will prove of great benefit to the mining districts it crosses, and indirectly will assist the farmers and lumbermen.

*Lake Catcha District.*—The Oxford Mines have run steadily during the year on ore from the Split and Picayune leads, both of which are still looking well. Some work was also done in the spring on the Battery lead, with very satisfactory results.

Owing to the weather but little prospecting was accomplished, though over forty leads are now cut on the property, most of which show gold, and several more are known to exist.

The yield for the year was 2161 ozs. from 1559 tons ore, making a total of 12775 ozs. from 8960 tons since operations commenced in 1882.

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*Tangier.*—A little work was done on the Brunswick Company's property, and some tributing and prospecting work. At Fifteen Mile stream the Egerton Company continued working, principally on areas 992, 993, the returns showing 946 ounces from 2151 tons of quartz. At Lochaber, in the fall, Mr. Ashton made all preparations for opening the main lead, and a road was built into the mine from the end of the East River of Sheet Harbor road.

*Salmon River.*—Operations have been steadily continued at this mine, and the total product to the end of 1888 was 31,168 ounces, from 65,408 tons of quartz. The principal work has been to the eastward in the saddle back divisions of the lead, the total thickness of quartz varying up to 20 feet. During the past summer a small fall occurred in the mine, but was secured, and the amount of timber has been increased. The practice of starting slopes from the shaft and taking out all the vein, and trusting to scaffolds for packing, answers fairly well in the ordinary quartz mining work in this Province, but in all leads exceeding 5 or 6 feet in thickness, blocks of rock should be left near the shaft and at intervals through the slopes, in order that any movement of the walls may be local and not general over the mine. With little trouble these blocks, if they carry quartz considered of any value, can be so disposed as to admit of their extraction before the mine is totally abandoned.

#### GUYSBORO' COUNTY.

*Stormont.*—The principal mining operations have been at Isaac's Harbor. The Island Mining Company have been working on Hurricane Island. Three pits have been sunk. One pit of 100 feet depth has been worked on the vein for 120 feet. Another of 70 feet depth has been opened out 133, and connects with a pit 37 feet deep. 1904 tons of ore have been milled, yielding 2,222 ounces of gold. A road has been built connecting the mine on the island with the main road. Surveys have been made of the workings, and the management have had impressed on them the necessity of caution in mining under the waters of the harbor. Some work has also been done on the west side of the harbor, on leads believed to be counterparts of these opened on the east side.

*Wine Harbor.*—During the summer and fall an effort was made to reopen workings in this district. A great deal of time has been spent in searching for the eastern part of the Plough lead, and the returns are principally from the Napier property.

*Sherbrooke.*—The depression in this district still continues, and the attention of those interested in it is being turned to low grade ores.

In October and November about 130 tons, yielding 13 ounces, were taken from areas 540, 541 and 537; block 77.

At the Crow's Nest no mining was carried on, but a few tons of sand and dump rock were crushed.

In Goldenville little was done. On the Mayflower and adjoining areas to the north Mr. James H. McDonald mined and crushed 1950 tons of low grade rock, which yielded 383 ounces. It is to be hoped that Mr. McDonald will be able to extend his operations next summer.

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Numerous discoveries of gold have been reported from all points on the auriferous belt, and some of them, it is confidently believed, will prove valuable.

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## IRON MINING.

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The operations of the Londonderry Company have steadily continued during the past season. The returns show that 41,619 tons of ore were mined, and that 164 men were employed about the mine, above and below ground. The mine was visited by Mr. Madden, Deputy Inspector, who reported that the operations were satisfactorily conducted.

The linnonite deposit of Brookfield was worked by Mr. R. E. Chambers, who took out about 1000 tons, giving employment to 8 men and as many teams. The vein was cross-cut and proved to be 18 to 20 ft. wide. The ore hitherto extracted has been smelted at Londonderry. It is of excellent quality and very accessible, being within two and a half miles of the railway.

On the East River of Pictou, 342 tons were mined by the Messrs. Grant, and shipped via Hopewell to the Londonderry furnaces. This ore, as alluded to in previous reports, is also a linnonite of good quality.

Mr. Holmes continued prospecting, and opened a valuable bed of specular ore, 20 feet wide, on the south side of the River below Sunny Brae. In the fall, surveys were made for a line of railway to his properties, and preparations made for opening the deposits by tunnels.

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## COPPER.

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During the past season a good deal of interest has been shown in the search for workable deposits of ores of this metal throughout the Province. The increased value of the metal has stimulated the output of producing mines all over the world, and as many were able to furnish the ore or metal at remunerative rates, it has naturally followed that all deposits in any respect promising have received much attention.

For a number of years past the demand for this metal has been to a certain extent defined. Now, however, the extension of its adaptability to several important industrial developments, especially to that of electricity, has brought out the fact that like tin, it must in the future be one of the semi-royal metals.

In view of the fact that in this Province there are extensive areas of Carboniferous and Laurentian rocks containing important indications of the presence of this metal, it may not be amiss to refer to the attempt now made to open Copper-bearing strata on a working scale.

In a paper read by me some years ago before the Geological Society of London, I gave a description of the then known deposits of Copper ore and their Geological relations.

During the year 1888, the Copper ores of Tatamagouche were further prospected, and samples shipped. The Margaretsville, Annapolis County, Copper Licenses were renewed. At this point the "Volcanic Ash" of Triassic age as well as the overlying "traps" carry stringers and disseminated grains of native Copper. The explorations hitherto made have given promise of belts of cupriferous rock of workable value.

In Antigonish County, at several points, the Carboniferous Limestones carry near their junction with Devonian strata, veins and masses of rich Copper pyrites, and the dioritic dykes cutting the latter measures are frequently Copper-bearing. As yet, however, explorations have been carried far enough only to warrant expectations of future value.

In Cape Breton the Laurentian measures appear to show greater copper values than the rocks of any other age. At Coxheath, near Sydney, vigorous and successful developments have proved the fact that veins of Copper ore of workable value do exist in Nova Scotia.

The Eastern Development Company, Limited, have secured two leases, giving them a title to the copper and associated gold and silver over a tract about three miles in length. Their property, situated



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about four miles from the head of Sydney Harbor, lies along the northern side of the Coxheath hills.

The easterly lease is known as the "Coxheath," and the westerly as the "Argyle." On the Coxheath two shafts have been sunk, known as the East and West shafts. When they reached the depth of about 175 feet, and machinery became needed, it was decided to push explorations in the west shaft on account of the surface at this point being more favourable for the convenient location of the necessary machinery, etc.

The western shaft is two hundred feet deep, from the bottom a cross cut has been driven south 210 feet, which cuts at 67 feet a vein 5 feet wide, showing copper ore. At the shaft bottom a level has been run east about 110 feet, and a cross cut made south to the five-foot vein referred to. This is a promising vein, averaging, as far as I could judge, 3 to 4 per cent. of copper in the lode. A cross cut going north from the face of this level, at 120 feet, cut a vein from 6 to 12 feet wide, and it was followed to the west until opposite the shaft, when it was cut by a prolongation of the south cross cut to the north, and the vein further driven on to the westward for 85 feet. This lode, where cut by the cross cut, should average 10 p. c. copper, and I think that the vein, as opened for a distance of 200 feet, should average in the lode 6 per cent. of copper. At the upper 120 feet level some stoping has been done on a vein averaging 4 feet, lying in the shaft. This has been driven in, and a considerable amount of ore taken out. This vein holds in depth, as shown at the lowest level, is smaller, but holds purple ore in quantity enough to keep its value. The stoped ore yielded 10 per cent. copper.

A cross cut is now being driven from the 140 feet level to cut the ten feet vein. This should open up a very large extent of good ground.

It is proposed to sink deeper and to cut these three veins again. This will open up a large extent of stoping ground, and an output of 100 tons a day should be easily maintained. There is already at hand about 100 tons of 12 to 18 per cent. ore, and several hundred tons running from 3 to 8 per cent., collected during the development work.

The surface work comprises five Rand duplex drills and compressor. Hoisting engine having two cylinders, 8 by 8 inches, and a five feet drum. There is also an ample supply of pump power, but at present eight hours discharge through a 2½ inch column keeps the mine dry. Steam is supplied by three portable boilers aggregating about 125 horse power.

An engine with 10 by 20 inch cylinder drives the saw mill, lathe, crusher, and screens. There are all necessary shops, magazines, and boarding houses for about 150 men.

At the time of my visit an ore dressing house 60 feet square was being built, and arrangements were being made to add another compressor, seven drills, and a 50 horse power boiler to the present plant.

A line of railway has been located and the right of way arranged for from the mine to a loading and smelting ground on Sydney harbor, about 6 miles from the mine. The work on the westerly or "Argyle" lease has so far been confined to surface explorations, which has exposed the crop of two very promising veins supposed to be the continuation of those now being worked on the "Coxheath."

The gentlemen developing these mines have, so far as I can judge, satisfactorily answered in the affirmative the question of the existence of workable deposits of Copper ore in this Province. Their mine is well equipped, the veins strong and of good value, and I am confident that before long I shall have the pleasure of reporting to you that they are in regular ore extraction and contributing to your royalty accounts.

### COXHEATH COPPER MINES RETURNS, 1888.

*(Work resumed September 18th.)*

Underground, skilled laborers.....	22
Laborers.....	10 days, 2,848
Above ground, skilled labor.....	19
Laborers.....	26 days, 4,005
Two horses employed.	
Ore raised in 1888.....	600 tons
Ore in stock .....	1500 "

Attention has also been paid during last summer to the copper ores of Cheticamp, Inverness Co., and to those of French Road and Eagle Head, Gabarus Bay, which are all said to be in rocks of the same age as those of Coxheath. When a start is made by the Coxheath company at smelting ore, which is part of the scheme, there is no doubt that there will be many localities that will supply ore to the smelters, as freights to the United States or Swansea form a considerable item in the cost of marketing copper ores.

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## LEAD.

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At the Smithfield Mine there has been no new development. It is stated, however, that arrangements have been made for the introduction of capital to work it. A discovery was reported from Musquodoboit of a vein carrying a considerable percentage of lead, and some gold and silver.



## GYPSUM.

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The exportation of this mineral has been steadily continued. The shipments from Windsor were 105,815 tons, from Cheverie 17,125 tons. Smaller amounts were shipped from Walton, Lennox Passage, and St. Ann's Harbor.

In addition to the amount of Gypsum given in the Statistical Return, about 2000 tons were shipped from Lennox Passage, Richmond County.

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## MANGANESE.

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Returns have been received from Tenny Cape, and Onslow. The fall in the price of the ore lessened the production during the summer; but as the value has risen during the fall it is expected that the business will be brisker next summer. Mr. Moseley expects to re-open his mines at Loch Lomond next summer.

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## ANTIMONY.

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Mr. McNaughton continued working his Antimony mine at Rawdon. He returns a shipment of 308 tons of No. 1 ore. As yet no success has attended the search for similar deposits in this locality, although there is a considerable extent of ground likely to contain them.

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In conclusion, I would remark that generally speaking the mining operations of last year were satisfactory to those engaged, and that they were accompanied with an unusually low accident list.

And have the honor to be,

Sir,

Yours obediently,

E. GILPIN, JR.,

*Inspector of Mines.*

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

No.	Lessee.	District.	Area Square Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay et al.....	.....	1
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	{ Eastern Development Co. {	.....	1
95		.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River .....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James .....	East River.....	1
43	" .....	" .....	1
Total area under lease.....			9 square miles,

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

No.	Lessee.	District.	Area Square Miles.
IRON.—(CONTINUED.)			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.....	N. Side East Bay .....	1
91	Brookman, S. L.....	East Bay .....	1
93	Brookman, S., et al.....	" .....	1
102	C. L. Ingraham .....	" .....	1
103	A. McKenzie et al .....	" .....	1
92	Matheson, D., et al.....	" .....	1
84	Protheroe, Pryse.....	Cow Bay .....	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co .....	Whycocomagh .....	1
Total area under lease .....			17 square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		CUMBERLAND CO.				
21	Bligh, James, et al	.....	1	.....	John Moffatt.....	River Hebert.
47	Boston C. M. Co.	.....	1	.....	Jas. Baird.....	Maccan.
54	Cumberland C. M. Co.	Chignecto	4	Working.		
12	} Cumberland R'y & Coal Co.	.....	9	Working.	R. G. Leckie ..	Springhill.
6, 7, 8, 44, 52, 55		Springhill			W. Hall.....	
17		.....	2	Working.	P. McNaughton..	Joggins.
	Joggins C. M. Association....	Joggins	2			
	Joggins C. M. Co.	.....	1			
5	Lawson C. M. Co.	Maccan	2			
51, 53	Milner, Christopher	.....	4	Working.		Maccan.
1, 2, 3, 4	New York & Acadia Co.	Scotia	1	Working.	W. Patrick.....	Maccan.
56	W. Patrick et al.....	Patrick	1		J. L. Hewson....	Oxford
57	Salt springs Coal Co.....	.....	1	Working.	M. Dunlop,.....	River Hebert.
16	Minudie M. & T. Co.....	.....	5	.....	J. S. Hickman...	Amherst.
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.)	.....	2			
9	Victoria Coal Mining Co.....	.....				
			36			

## LIST OF COAL LEASES.—(CONTINUED.)

No.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	1	Working.	H. S. Poole . . . .	Stellarton . . . .
3	1	"	J. Maxwell . . . .	Westville . . . .
42	4	.....	T. Turnbull . . . .	Vale Colliery . .
23	3	Working.	J. Dunbar . . . . .	Albion Colliery.
10	4	Working.		
11	1			
13, 14	2			
12	1	Working.	Robert Simpson . .	Westville.
6	1			
24	1			
45	2	Working.	Muir & Sons . . . .	New Glasgow.
	22			
3	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney. Cow Bay.
2	1			
5, 28	2	Working.	R. Belloni . . . . .	Cow Bay.
29	1			

	Caledonia C. & R. Co. ....	Caledonia .....		Working.	David McKeen ..	Glace Bay.
15	" (sea area) ..	.....	1			
31	Halifax Coal & Iron Co. ...	Ontario .....	1	Working.	<i>Jno. Sutherland.</i>	Pt. Caledonia.
8, 9	General Mining Association ..	Bridgeport .....	1½		{ Rich. H. Brown.	Sydney Mines.
	" " " (sea area) ..	Sydney .....	2	Working.	{ Cunard & Morr'w	Halifax.
27	" " " (sea area) ..	" .....	18		{ H. Mitchell....	Bridgeport.
	Low Point, Barasois, and.....	Lingan .....	4	Working.	J. G. S. Hudson..	Low Point.
38, 39	Lingan Mining Co., (Ltd.) ..	" .....	13			
10, 21	Gibson, John, et al .....	.....	10			
	Glace Bay Mining Co. ....	Glace Bay .....	2			
4, 12, 16	International Coal Co., (Ltd.)	International .....	3	Working.	{ E. P. Archbold..	Halifax.
6, 13, 18, 19, 30	Merchants' Bank of Canada	Gardner .....	5	Working.	{ Chas. Rigby....	Lt. Glace Bay.
66	McLeod, Hugh .....	.....	2		<i>P. Johnstone....</i>	Bridgeport.
52, 53	Ross, H. E., et al .....	.....	2			
40, 41, 42	Ross, W. J., et al, (sea area)	.....	3			
79	Weatherbe & Hendry, "	.....	1			
32	Sydney & Louisburg Coal &	.....	3			
23, 25, 70	R..R. Co. (Ltd.) ....	Schooner Pond ..				
14, 24	" " " "	Reserve .....				
49	" " " "	Lorway .....	10	Working.	{ F. C. Kimber ..	Sydney.
64, 65, 68	" " " "	Emery .....			{ <i>W. Routledge ..</i>	Reserve Mines.
69	Sydney C. M. Co. (sea areas.)	.....	10			
54 to 63	Weatherbe & Kirby.....	.....				
67	Weatherbe, R. L., (sea area.)	.....	1			
78	Low Point, Barasois and	.....	5			
96, 97, 98, 99, 100	Lingan Mining Co., Ltd. ...	.....	5			
	" (sea areas)	.....	2			
			109½			

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		INVERNESS CO.				
7, 12	Inverness C. I. & R. C.....	.....	2			
13	McGregor, J. D.....	Port Hood .....	3			
4	Richey, M. H., et al .....	.....	1			
11	Ross, W. J.....	Broad Cove .....	1			
6	Ross, H. E., et al, ( <i>sea area</i> )...	.....	1			
10	Tremaine, E. D., ( <i>sea area</i> )...	.....	1			
			9			
		VICTORIA CO.				
2	Kenny, T. E.....	New Campbellton .....	3			
3, 4, 5	Ross, Wm.....	Black Rock .....	5			
			8			

Total area under lease.....185½ square miles.

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	102,326	91,642	99,066	72,560	81,459	4,506	.....	.....	282,851	168,708
2nd Quarter.....	124,130	108,971	117,441	95,542	218,720	181,969	.....	.....	460,291	386,482
3rd Quarter.....	124,061	109,628	121,361	123,884	329,686	368,007	.....	.....	575,108	601,519
4th Quarter.....	120,312	109,308	136,320	126,907	201,246	183,768	.....	.....	457,878	419,983
Total.....	470,829	419,549	474,188	418,893	831,111	738,250	.....	.....	1,776,128	1,576,692
1887.....	499,472	465,148	384,906	339,034	786,360	715,442	100	60	1,670,838	1,519,684
1886.....	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885.....	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510



TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			TOTALS.			Grand Total.
	Round.	Run of Mine.	Slack.	Round.	Run of Mine.	Slack.	Round.	Run of Mine.	Slack.	Round.	Run of Mine.	Slack.	
Nova Scotia Land Sales	47,278	6,996	33,280	109,058	...	78,273	1,176	...	4,460	157,512	6,996	116,013	280,521
Sea borne .....	22,089	.....	949	35,086	...	6,388	155,233	7963	21,676	192,408	7,963	29,013	229,384
Total .....	69,367	6,996	34,229	144,144	...	84,661	156,409	7963	26,136	349,920	14,959	145,026	509,905
New Brunswick .....	64,675	46,579	29,322	37,378	...	4,937	30,950	...	789	133,003	46,579	35,048	214,630
Newfoundland .....	.....	.....	.....	.....	...	.....	79,883	610	3,232	79,883	610	3,232	83,725
P. E. Island .....	.....	.....	.....	9,298	...	22,553	15,258	...	9,240	24,556	.....	31,793	56,349
Quebec .....	28,210	130,514	24,203	105,970	...	8,412	310,975	11041	58,996	445,155	141,555	91,611	678,321
West Indies .....	.....	.....	.....	519	...	60	2,532	...	.....	3,051	.....	60	3,111
United States .....	.....	183	5,271	.....	...	961	2,685	...	21,098	2,685	183	27,330	30,198
Other Countries .....	.....	.....	.....	.....	...	.....	453	...	.....	453	.....	.....	453
Total .....	162,252	184,272	93,025	297,309	...	121,584	599,145	19614	119,491	1,038,706	203,886	334,100	1,576,692

## COAL.—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1888.	Year 1887.
Nova Scotia :						
Land Sales ..	65,776	67,548	56,376	90,821	280,521	266,005
Sea Borne ..	6,857	46,633	81,245	94,649	229,384	203,459
N. S.—Total ..	72,633	114,181	137,621	185,470	509,905	469,464
N. Brunswick ..	46,615	45,909	59,284	62,822	214,630	186,511
Newfoundland ..	.....	15,857	36,250	31,618	83,725	82,053
P. E. Island ..	.....	11,931	24,628	19,790	56,349	50,515
Quebec .....	49,460	191,793	324,943	112,125	678,321	650,858
West Indies ..	.....	555	1,144	1,412	3,111	6,140
United States ..	.....	5,803	17,649	6,746	30,198	73,892
Other countries ..	.....	453	.....	.....	453	151
Total .....	168,708	386,482	601,519	419,983	1,576,692	1,519,684
1887 ..	138,814	376,174	551,643	443,053	1,519,684	
1886 ..	153,054	356,340	527,654	336,618	1,373,666	

## COAL.—GENERAL STATEMENT.

1888.	Produce.	Sold.	Colliery Consumption.
1st Quarter .....	282,851	168,708	42,403
2nd " .....	460,291	386,482	42,156
3rd " .....	575,108	601,519	30,316
4th " .....	457,878	419,983	42,568
Total .....	1,776,128	1,576,692	157,443
1887 .....	1,670,838	1,519,684	139,777
1886 .....	1,502,611	1,372,656	142,421

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1888.

MINES REPORT.

COLLIERIES.	Produce.	SALES.				COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.	Total.	Engines.	Workmen.
CUMBERLAND Co.:							
Chignecto .....	14,807	7,065	3,845	.....	10,910	3,390	271
Joggins .....	48,448	36,853	6,400	.....	43,253	4,252	698
Minudie .....	1,379	1,277	73	.....	1,350	29	.....
Springhill ...	406,195	97,057	82,707	184,272	364,036	23,245	18,906
Pictou Co.:							
Acadia .....	290,732	172,322	76,705	.....	249,027	38,960	6,278
Barton .....	.....	147	3	.....	150	.....	.....
Black Diamond .....	24,003	17,213	6,473	.....	23,686	511	278
East River .....	785	635	.....	.....	635	130	50
Intercolonial .....	158,668	106,992	38,403	.....	145,395	6,556	2,557
CAPE BRETON Co.:							
Block House .....	6,808	6,568	5	.....	6,573	.....	253
Bridgeport .....	24,227	21,214	1,113	.....	22,327	205	438
Caledonia .....	112,785	74,656	28,275	.....	102,931	1,331	1,357
Fracklyn .....	8,241	6,287	1,954	.....	8,241	.....	.....
Glace Bay .....	79,849	67,042	10,364	.....	77,406	3,871	1,289
Gowrie .....	129,480	87,935	20,437	.....	108,372	3,798	4,390
International .....	102,169	64,173	23,190	12,181	99,544	3,120	1,571
Ontario .....	4,613	4,327	67	.....	4,394	131	82
Reserve .....	121,116	93,763	15,300	.....	109,063	5,495	2,793
Sydney .....	151,985	113,821	13,075	.....	126,896	15,942	7,558
Victoria .....	89,838	59,359	5,711	7,433	72,503	5,647	2,063
Total .....	1,776,128	1,038,706	334,100	203,886	1,576,692	116,613	50,832

COLLIERY CONSTRUCTION ACCOUNT, 1888.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machin- ery.	Colliery Buildings.	Dwell- ings.	Surface Works.	Railways.	Wharves.	Pros- pecting.	Totals.
CUMBERLAND Co.											
Chignecto .....	.....	.....	.....	\$2335 00	\$ 175 00	.....	.....	.....	.....	\$150 00	\$2680 00
Joggins .....	.....	.....	\$ 180 00	450 00	300 00	\$2500 00	\$150 00	.....	.....	.....	3580 00
Scotia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springhill.....	.....	\$2230 00	.....	6991 00	6111 00	.....	1203 00	.....	.....	2234 00	18769 00
Pictou Co.											
Acadia .....	.....	4351 00	.....	116 00	1273 00	.....	.....	.....	.....	.....	5740 00
Albion Mines .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Black Diamond.....	.....	731 00	1096 00	6041 00	400 00	60 00	2157 00	.....	.....	125 00	10610 00
Intercolonial .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East River.....	.....	200 00	.....	.....	.....	.....	.....	.....	.....	.....	200 00
CAPE BRETON Co.											
Block House .....	.....	.....	2050 00	.....	.....	.....	.....	\$1010 00	.....	.....	3060 00
Bridgeport .....	.....	.....	.....	.....	.....	.....	95 00	.....	.....	.....	95 00
Caledonia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glace Bay .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gowrie.....	.....	.....	1407 00	.....	.....	.....	500 00	.....	\$1063 00	.....	2970 00
International.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lingan .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario .....	.....	.....	.....	.....	.....	.....	10 00	.....	.....	.....	10 00
Reserve .....	.....	.....	514 00	227 00	133 00	176 00	.....	99 00	.....	.....	1149 00
Sydney Mines .....	.....	.....	.....	1750 00	.....	3464 00	.....	.....	.....	.....	5214 00
Victoria.....	.....	320 00	7098 00	.....	2270 00	450 00	3160 00	.....	.....	.....	13298 00
Total.....	\$7832 00	\$12345 00	\$17910 00	\$10662 00	\$6650 00	\$7275 00	\$1109 00	\$1063 00	\$2509 00	\$67355 00	

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31st, 1888.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average num-ber of tons per Cutter.	Average tons per day per Cutter.	Average quan-tity raised per day.	HORSES.		PITS WORKED.
	Skilled Labor.	Boys.	Days.	Skilled Labor.	Labo-ers.	Boys.	Days.	Skilled Labor.	Labo-ers.	Boys.	Days.	Persons.	Days' Labor.	Persons.				Above.	Below.	
CUMBERLAND Co.																				
Chignecto .....	19	6	8653	4	12	3	5684	...	...	...	...	53	14337	...	779	3	58	2	2	253
Joggins .....	54	10	19410	4	28	4	8350	...	...	...	853	114	28613	...	897	3	1748	3	6	277
Minudie .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Springhill .....	539	171	69923	119	211	17	74636	14	12	...	6299	1355	150858	...	753	3	1889	16	55	215
PICOU Co.																				
Acadia .....	283	90	151099	84	139	39	75998	13	6	...	4726	980	231823	...	1027	1	379	16	18	256
Black Diamond .....	17	4	7846	6	7	...	3654	...	...	...	...	45	11500	...	1411	...	...	...	2	...
East River .....	3	...	540	1	...	...	259	...	...	...	...	4	799	...	261	2	5	...	...	154
Intercolonial .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Barton .....	...	...	...	2	...	...	2	...	...	...	...	2	...	...	...	...	...	1	...	...
CAPE BRETON Co.																				
Block House .....	10	...	1304	6	...	...	808	...	...	...	...	18	2112	...	680	6	69	3	2	98
Bridgeport .....	21	3	8180	2	3	2	2499	...	...	...	6	32	10635	...	1153	5	108	2	4	224
Caledonia .....	116	33	35805	16	32	9	15029	6	2	...	2028	230	52862	...	972	5	593	9	23	190
Franklyn .....	13	2	3298	...	...	...	192	...	...	...	...	15	3490	...	633	...	...	...	2	...
Glace Bay .....	117	24	24202	31	30	4	17508	...	...	...	...	215	41710	...	682	6	760	6	19	105
Gowrie .....	129	38	35432	26	58	15	26224	2	4	...	114	290	61770	...	1003	6	814	9	24	159
International .....	115	24	11861	30	32	10	6110	...	...	...	...	245	17971	...	898	6	658	6	24	155
Ontario .....	12	1	1136	2	4	...	1125	...	...	...	...	20	2261	...	384	3	32	3	1	128
Reserve .....	120	33	39883	22	25	13	15010	4	3	...	1521	235	56414	...	1009	4	531	7	19	228
Sydney .....	225	41	93711	58	84	35	48889	6	1	...	2257	566	144857	...	675	3	617	12	48	246
Victoria .....	102	21	41614	8	59	9	23744	...	...	...	...	252	65358	...	880	3	380	5	6	236
Total .....	1895	586	553897	421	723	160	325721	53	28	...	17804	4651	897422	...	...	...	...	100	255	...

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1870	168,180	\$1 25
1851	116,274	"	1871	165,431	"
1852	87,542	"	1872	154,092	75
1853	120,764	"	1873	264,760	"
1854	139,125	Free.	1874	138,336	"
1855	103,222	"	1875	89,746	"
1856	126,152	"	1876	71,634	"
1857	123,335	"	1877	118,216	"
1858	186,743	"	1878	88,495	"
1859	122,720	"	1879	51,641	"
1860	149,289	"	1880	123,423	"
1861	204,457	"	1881	113,728	"
1862	192,612	"	1882	99,302	"
1863	282,775	"	1883	102,755	"
1864	347,594	"	1884	64,515	"
1865	465,194	"	1885	34,483	"
1866	404,252	"	1886	66,003	"
1867	338,492	\$1 25	1887	73,892	"
1868	228,132	"	1888	30,198	"
1869	257,485	"			

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

*Nova Scotia Coal Sales, from 1785 to 1898 (Inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791			2,670	1847	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320	51,048	1851	153,499	1,533,798
1796	5,249		1852	189,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775		1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130	70,452	1861	326,429	2,399,829
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336	91,527	1871	596,418	4,927,339
1816	8,619		1872	785,914	
1817	9,284		1873	811,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980		1876	634,207	
1821	11,388		1877	697,065	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825		140,820	1881	1,035,014	7,317,430
1826	1882		1,250,179		
1827	1883		1,297,523		
1828	1884		1,261,650		
1829	1885		1,254,510		
1830	1886		1,373,666		
1831	37,170		1887	1,519,684	
1832	50,369		1888	1,576,692	
1833	64,743		Total....	28,015,489	
1834	50,813				
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198				
839,954					

## SUMMARY.

1785 to 1790	14,349	1831 to 1840	839,954
1791 to 1800	51,048	1841 to 1850	1,533,798
1801 to 1810	70,452	1851 to 1860	2,399,829
1811 to 1820	91,527	1861 to 1870	4,927,339
1821 to 1830	140,820	1871 to 1880	7,317,430

# GOLD — GENERAL STATEMENT FOR THE YEAR 1888.

*Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended Dec. 31st, 1888.*

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Tons of Quarts Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold.			
							Oz.	Dwt. Grs.	Oz.	Dwt Grs.	Oz.	Dwt. Grs.		
Sherbrooke.....	4	8,980	3	2	1	2,858	0	3	0	4	22	535	8	18
Salmon River.....	1	20,594	1	.....	1	9,925	0	6	0	10	1	3,354	10	0
Oldham .....	3	15,570	1	.....	1	2,106	0	16	1	9	22	1,699	9	19
Waverley .....	1	4,132	2	.....	2	619	0	7	0	12	9	232	9	10
Caribou .....	4	22,171	2	1	1	6,313	0	8	1	9	9	2,729	10	15
Uniacke .....	2	8,661	4	4	.....	612	1	0	4	14	13	632	7	1
Rawdon .....	.....	.....	1	1	.....	2,760	0	6	0	15	16	952	15	20
Lake Catcha .....	1	14,713	3	3	.....	1,611	1	8	2	17	21	2,284	17	3
Whiteburn .....	1	9,502	3	3	.....	1,292	2	3	4	12	3	2,799	4	8
Fifteen Mile Stream	1	8,141	1	1	.....	2,151	0	8	0	10	12	946	8	0
Stormont.....	1	12,395	1	1	.....	1,904	1	3	1	13	14	2,222	6	0
Tangier .....	1	5,966	2	2	.....	539	0	9	0	16	5	263	1	0
Renfrew .....	1	6,095	2	.....	2	1,145	0	11	0	18	5	642	16	10
Wine Harbor .....	1	5,543	1	1	.....	324	0	14	1	5	22	239	2	0
Unproclaimed, &c. . .	3	21,309	8	8	.....	2,019	1	8	4	14	14	2,872	17	2
Totals .....	25	163,772	35	27	8	36,178	0	15	.....	.....	.....	22,407	3	10



## MONTHLY STATEMENT FROM EACH GOLD DISTRICT

MONTH.	CARRIBOU.							UNIACKE.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
1888.														
January .....	3	1575	63	162	74	13	0	1	834	33	70	14	4	11
February .....	3	1773	70	311	143	18	12	2	778	31	.....	.....	.....	.....
March .....	3	1811	72	356	189	13	15	2	801	32	.....	.....	.....	.....
April .....	3	1782	71	183	92	3	0	1	392	15	.....	.....	.....	.....
May.....	3	1816	72	450	198	19	9	1	422	16	250	38	14	0
June .....	3	1612	64	639	362	9	19	1	421	16	.....	.....	.....	.....
July .....	3	1605	64	852	641	1	9	1	540	21	.....	.....	.....	.....
August.....	5	1886	75	681	259	19	6	2	616	24	141	50	13	10
September .....	6	2208	88	671	230	19	10	2	915	36	45	93	14	18
October .....	5	2104	84	806	192	6	21	2	1035	41	46	217	8	10
November .....	4	2093	83	579	172	18	10	2	992	39	30	121	12	0
December.....	4	1906	76	623	170	8	0	2	915	36	30	96	0	0
Totals.....	4	22171	.....	6313	2729	10	15	2	8661	.....	612	632	7	1

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	RAWDON.							LAKE CATCHA.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January .....	..	.....	....	717	307	5	..	1	1138	45	97	181	15	..
February .....	..	.....	....	420	148	10	..	2	1227	49	131	379	5	..
March .....	..	.....	....	853	337	12	..	3	1480	59	154	224	9	..
April .....	..	.....	....	200	46	16	10	1	1698	67	109	117	3	..
May.....	..	.....	....	300	27	12	10	1	1357	54	116	236	10	..
June .....	..	.....	....	105	21	17	0	1	1295	51	177	242	18	3
July .....	..	.....	....	100	35	5	0	1	1099	43	165	217	5	..
August .....	..	.....	....	65	27	18	..	1	1173	46	173	200	12	..
September .....	..	.....	....	.....	....	..	..	2	1171	46	128	103	10	..
October .....	..	.....	....	.....	....	..	..	1	1054	42	169	165	18	..
November .....	..	.....	....	.....	....	..	..	1	1198	47	117	133	17	..
December .....	..	.....	....	.....	....	..	..	1	823	32	75	81	15	..
Totals.....	.....	.....	.....	2760	952	15	20	1	14713	....	1611	2284	17	3

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	WHITEBURN.							FIFTEEN MILE STREAM.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
1888.														
January .....	1	380	15	127	247	18	15	1	504	20	160	53	10	0
February .....	1	376	15	114	251	17	4	1	543	21	150	65	0	0
March .....	1	385	15	121	247	13	0	1	697	27	185	86	10	0
April .....	1	385	15	106	289	10	0	1	785	31	210	98	0	0
May .....	1	438	17	80	250	6	13	1	758	30	200	105	0	0
June .....	1	408	16	99	225	11	6	1	851	34	220	102	0	0
July .....	1	374	14	82	225	13	7	1	733	29	216	98	8	0
August .....	1	390	15	113	259	10	3	1	741	29	195	77	0	0
September .....	2	865	34	35	119	5	0	1	714	28	200	79	0	0
October .....	3	2850	114	110	206	15	7	1	772	30	170	74	0	0
November .....	2	1444	57	213	328	13	12	1	780	31	195	82	0	0
December .....	2	1207	48	92	146	10	13	1	263	10	50	26	0	0
Totals .....	1	9502	....	1292	2799	4	8	1	8141	...	2151	946	8	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	STORMONT.						TANGIER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.
1888.														
January .....	..	140	5	.....	....	..	..	1	629	25	50	31	..	..
February .....	1	790	31	60	87	..	..	1	922	36	75	41	6	0
March .....	2	1038	41	111	192	13	..	1	839	33	70	43	0	0
April .....	1	1098	43	150	251	17	..	1	565	22	40	32	9	0
May.....	2	1425	57	172	263	3	..	1	571	21	46	29	5	..
June .....	1	924	36	152	190	4	..	1	574	22	55	23	17	..
July .....	1	1054	42	1:9	177	8	..	1	356	14	53	20	0	0
August .....	2	1131	45	252	294	8	0	1	271	10	.....	..	..	..
September .....	1	935	37	15	18	10	..	1	249	9	50	14	4	..
October .....	1	1226	49	396	385	19	..	1	598	23	70	21	..	..
November .....	1	1383	55	222	193	5	0	....	92	3	.....	..	..	..
December .....	1	1251	50	235	167	19	0	1	300	12	30	7	..	..
Totals.....	1	12395	....	1904	2222	6	0	0	5966	....	539	263	1	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	RENFREW.						WINE HARBOR.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January . . . . .	1	678	27	110	53	18	12	1	176	7	.....	.....	.....	.....
February . . . . .	1	593	23	163	63	5	0	2	411	16	17	9	15	0
March . . . . .	1	703	28	138	54	15	0	1	209	8	.....	.....	.....	.....
April . . . . .	1	702	28	180	78	0	0	1	282	11	.....	.....	.....	.....
May . . . . .	1	716	28	120	64	0	0	1	361	14	.....	.....	.....	.....
June . . . . .	1	554	22	100	42	0	0	1	419	16	70	58	2	0
July . . . . .	1	512	20	70	32	0	0	2	707	31	57	56	6	0
August . . . . .	2	410	16	.....	.....	.....	.....	1	561	22	68	42	10	0
September . . . . .	2	463	18	190	204	10	0	2	617	24	75	45	15	0
October . . . . .	1	336	13	40	25	14	0	2	390	15	26	12	9	0
November . . . . .	1	309	12	.....	.....	.....	.....	3	674	26	.....	.....	.....	.....
December . . . . .	1	119	4	34	24	13	22	2	656	26	11	14	5	0
Totals . . . . .	1	6095	.....	1145	642	16	10	1	5463	.....	324	239	2	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNPROCLAIMED DISTRICTS, &c.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt. Grs.
January.....	5	1716	68	95	97	19 0
February .....	3	968	38	45	45	17 20
March .....	2	1232	49	43	7	7 ..
April .....	1	676	27	22	4	16 ..
May .....	2	1064	42	..	..	.. ..
June .....	3	1402	56	30	40	.. ..
July .....	5	3348	133	105	270	18 ..
August .....	3	2394	95	414	619	6 ..
September.....	3	2755	110	298	634	0 ..
October .....	2	1622	64	305	387	16 ..
November .....	1	1759	70	80	93	0 ..
December .....	4	2373	94	582	671	17 6
Totals.....	3	21309	....	2019	2872	17 2

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERBROOKE.							SALMON RIVER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.
1888.														
January .....	5	1014	40	278	63	..	..	1	1915	76	754	376	0	0
February .....	4	650	26	261	57	1	0	1	1840	73	890	447	0	0
March .....	4	816	32	257	43	14	18	1	1764	70	876	369	0	0
April .....	3	675	27	59	8	7	0	1	1595	63	780	276	10	0
May .....	2	500	20	55	4	9	0	1	1600	64	875	275	0	0
June.....	3	416	16	200	41	0	0	1	1850	74	850	220	0	0
July ....	6	1092	43	374	46	8	0	1	1700	68	860	290	0	0
August.....	3	620	24	200	43	10	0	1	1820	72	890	252	0	0
September .....	4	1025	41	255	56	16	0	1	1605	64	850	224	0	0
October .....	4	1080	43	240	59	..	..	1	1650	66	650	267	0	0
November .....	3	442	17	429	71	7	0	1	1635	65	750	202	0	0
December .....	4	650	26	250	40	16	0	1	1620	64	900	156	0	0
Totals.....	4	8980	....	2858	535	8	18	1	20594	..	9925	3354	10	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED)

MONTH.	OLDHAM.						WAVERLY.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January . . . . .	2	1276	51	261	258	5	0	1	960	38	105	39	14	0
February . . . . .	3	1545	61	179	228	2	18	1	686	27	97	59	7	15
March . . . . .	2	1634	65	227	340	0	0	1	646	25	67	18	12	15
April . . . . .	3	1330	53	153	52	18	0	1	544	21	7	2	11	0
May . . . . .	2	1194	47	68	39	0	0	2	571	22	160	54	16	0
June . . . . .	3	1184	47	95	62	2	0	2	725	29	183	57	8	4
July . . . . .	3	1572	62	274	27	9	14	...	...	...	...	...	...	...
August . . . . .	4	1471	58	191	102	4	0	...	...	...	...	...	...	...
September . . . . .	3	1138	45	116	101	0	0	...	...	...	...	...	...	...
October . . . . .	2	1064	42	172	143	0	0	...	...	...	...	...	...	...
November . . . . .	2	1056	42	219	120	11	0	...	...	...	...	...	...	...
December . . . . .	2	1106	44	151	224	17	11	...	...	...	...	...	...	...
Totals . . . . .	3	15570	...	2106	1699	9	19	0	4132	...	619	232	9	10



## GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Grs.		Oz.	Dwt.	Grs.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	122,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
Total	456161	10	8	611282	.....			4,103,354	.....	.....

INTERCOLONIAL RAILWAY.

Statement shewing the Quantities in Tons of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway during the Year 1888.

MONTH.	SPRINGHILL.		ACADIA.			DRUMMOND.		CHIGNECTO.	JOGGINS.	BLACK DIAMOND.
	Round.	Run of Mine.	Round.	Slack.	Coke.	Round.	Run of Mine.	Round.	Round.	Round.
January	2453	5068	5674	84	....	780	3125	....	1795	....
February	3309	4057	6347	62	12	416	2145	....	2860	342
March	3844	3604	7625	78	....	138	1597	12	3810	691
April	2214	1026	4279	100	12	3095	665	....	1911	1125
May	5360	.....	3438	96	....	2620	64	....	1144	1318
June	6719	.....	957	27	....	1468	....	20	1883	1804
July	8404	.....	2126	40	....	2142	....	....	2173	1167
August	5880	.....	2970	85	10	1068	....	....	1177	1278
September	8998	.....	1742	60	....	625	....	....	1445	1364
October	9593	15	2151	40	11	2006	....	....	2588	2089
November	4500	.....	2730	107	....	2948	....	....	1888	1930
December	8236	.....	3611	114	....	1989	....	....	1451	1318
Totals	69510	13770	43650	893	45	19355	7596	32	24125	14426

MONCTON, N. B, February 11th, 1889.

## INTERCONIAL RAILWAY.

*STATEMENT shewing number of Tons of Coal received at the following Stations from Mines in Nova Scotia, for Year ended 31st December, 1888.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax .....	43009	Point du Chene .....	92
Dartmouth .....	8243	Moncton .....	19238
Bedford .....	455	Salisbury .....	1148
Windsor Junction .....	5521	Petitcodiac .....	193
Wellington .....	78	Penobsquis .....	1732
Enfield .....	649	Sussex .....	316
Elmsdale .....	259	Apohaqui .....	12
Milford .....	59	Norton .....	90
Shubenacadie .....	385	Bloomfield .....	12
Stewiacke .....	482	Hampton .....	302
Brookfield .....	77	Rothsay .....	238
Truro .....	9474	Cold Brook .....	10505
Valley .....	25	St. John .....	49144
Riversdale .....	6	Weldford .....	26
West River .....	49	Kent Junction .....	645
Glengarry .....	24	Chatham Junction .....	3295
Hopewell .....	1302	Derby Junction .....	80
Stellarton .....	5691	Newcastle .....	86
New Glasgow .....	19538	Gloucester Junction ..	701
Pictou Landing .....	83921	Bathurst .....	50
Pictou .....	6548	Petite Roche .....	18
Belmont .....	48	New Mills .....	12
DeBert .....	6	Charlo .....	12
East Mines .....	6	Eel River .....	6
Londonderry .....	63965	Dalhousie .....	83
Folleigh .....	6	Campbellton .....	93
Wentworth .....	36	Metapedia .....	436
Greenville .....	30	St. Octave .....	12
Thompson .....	18	St. Flavie .....	12
Oxford .....	773	Rimouski .....	43
River Philip .....	12	Bic .....	6
Salt Springs .....	20	Trois Pistoles .....	33
Athol .....	24	River du Loup .....	3255
Maccan .....	6	St. Charles .....	30
Nappan .....	66	St. Henri Junction .....	13198
Amherst .....	7263	Chaudiere .....	74744
Aulac .....	401	Point Levis .....	10289
Sackville .....	5029	Levis .....	702
Dorchester .....	1426	West of Chaudiere .....	74799
Memramcook .....	265	East Extension Point ..	3074
Painsec Junction .....	6		
Shediac .....	268	Total .....	534231

Stations from :

STATIONS.	No. of Tons
Stellarton .....	169321
Westville .....	21502
New Glasgow .....	47899
Spring Hill .....	276827
Maccan .....	18682
Total.....	534231

MONCTON, N. B., Feb. 11th, 1889.

## MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

### \* GYPSUM.

	Tons.	Value.
Windsor .....	105,815	\$100,841
Cheverie .....	17,125	16,640
Walton .....	1,560	1,360
St. Ann's .....	1,300	1,150
Halifax .....	318	1,588
Total .....	126,118	\$121,579

### GRINDSTONES, ETC.

	Tons.	Value.
Lower Cove } A. Seaman & Co. }	1,400	\$16,800
Little River, Pictou Co.....	250	275 (?)
Granton, " .....	110	150 (?)
	1760	\$17,225

### \* MANGANESE.

	Tons.	Value.
Windsor (Tennycapc, etc.) .....	42	\$2,120
Cheverie .....	6	240
Walton .....	18	1,100
East Mountain, Colchester Co.....	40	3,000
	106	\$6,460

Average number of men employed, 8.

### \* ANTIMONY.

	Tons.	Days' Labor.
Rawdon .....	308	4329

### BARYTES.

Henderson & Potts, } Brookfield. }	Tons, 1,100
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### MOULDING SAND.

	Tons.	Value.
Cheverie .....	169	\$338

\*Amount exported.

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**IRON MINING.**

Londonderry .....	41,619	Tons.
Springville, Pictou Co.....	342	"
Brookfield, Colchester Co. ....	650	"
Total.....	42,611	

**AVERAGE FORCE EMPLOYED DAILY.****Skilled workmen :**

	No. of Men.	Days' Worked.
Underground .....	66	16,596
Above ground.....	14	4,145

**Unskilled workmen :**

Underground .....	52	12,018
Above ground.....	32	8,390
	<u>164</u>	<u>41,149</u>

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**LIMESTONE.**

	Tons.
Pugwash .....	100
Londonderry (ankerite).....	21
Brookfield .....	14,727
Parrsboro' .....	600

*Export Statement of Articles of Produce of the Mine from the Port  
of Halifax, N. S., for the year ending 31st December, 1888.*

ARTICLES.	The Produce of Canada.	
	Quantity.	Value.
Coal.....Tons.	21154	\$ 66292
Gold .....	.....	163327
Asbestos.....Tons.	8½	280
Copper Ore .....	.....	25
Gypsum.....Tons.	318½	1588
Antimony.....Tons.	352	6894
Manganese.....Tons.	38	3398
Coal or Kerosene Oil.....Gals.	692	129
All other Articles.....	.....	2
Total Mine.....	.....	\$241935

STATISTICAL OFFICE,  
Halifax, Jan. 17, 1889. }





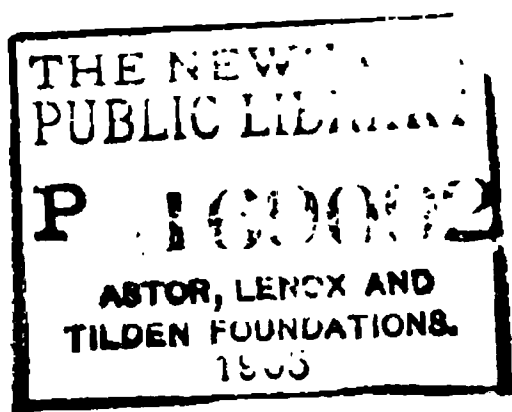


REPORT  
OF THE  
DEPARTMENT OF MINES,  
NOVA SCOTIA,  
FOR THE YEAR 1889.

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HALIFAX, N. S.:  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.  
1890.



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# DEPARTMENT OF MINES.

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## REPORT FOR THE YEAR 1889.

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*To His Honor the Hon. A. W. McLelan, Lieutenant-Governor of  
Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,  
*Commissioner of Public Works and Mines.*

HALIFAX, March 3rd, 1890.



**REPORT**  
**ON THE**  
**MINES OF NOVA SCOTIA,**  
**BY EDWIN GILPIN, Jr., A. M., F. G. S.,**

Fellow of the Royal Society of Canada, Member of Council  
of Canadian Society of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, March 1st, 1890.

TO THE HONORABLE  
CHARLES E. CHURCH, M. P. P., M. E. C.,  
*Commissioner of Public Works and Mines.*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending December 31st, 1889.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1889, compared with that of the previous year :

		1888.	1889.
Gold.....	Ounces....	22,407	26,155
Iron Ore .....	Tons.....	41,611	45,907
Manganese Ore .....	" .....	88	67
*Coal raised .....	" .....	1,776,128	1,756,279
*Coke made .....	" .....	29,808	35,565
†Gypsum .....	" .....	125,800	147,344
Barytes .....	" .....	1,100	—
†Grindstones, &c. ....	" .....	17,225	18,000
†Moulding Sand.....	" .....	169	170
†Antimony Ore .....	" .....	308	55
Limestone .....	" .....	15,448	19,000
Copper Ore.....	" .....		500

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

\* Ton of 2240 lbs.  
† Amount exported.  
‡ Value in dollars.



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In addition to detailed notices of the operations of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced not paying royalty to your Honorable Government.

I also beg to enclose the reports of Wm. Maddin, Jr., Esq., Deputy Inspector for the Counties of Cumberland, Pictou and Colchester, and of P. Neville, Esq., Deputy Inspector for Cape Breton.

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## COAL TRADE.

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The total sales for the year 1889 amounted to 1,555,107 tons, against 1,576,692 tons in 1888.

As compared with the sales of the year 1888 the most noticeable points are :—

The home sales were 550,425 tons as compared with 509,425 tons in 1888.

The Province of Quebec took 631,796 tons against 678,321 tons in 1888, and 650,858 tons in 1887.

The sales to New Brunswick were 195,174 tons against 214,630 tons in 1888.

The sales to Newfoundland and Prince Edward Island show no change of importance.

The sales to the United States were 29,986 tons as compared with 30,198 tons during the year 1888. Of the amount sent to the United States last year 24,331 tons were slack, 190 tons were run of mine, and only 5,465 tons were round coal.

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## CUMBERLAND COUNTY.

The total sales of this County were 419,628 tons against 419,549 tons in 1888.

The production of the Springhill Mines was 425,149 tons. The fire in the Syndicate Slope was successfully extinguished by damming water up against it. It is proposed to utilise it for the present as an up-cast and travelling road. The New or No. 5 Slope shows the turn of the measures toward Amherst. It is now down about 1200 feet, and the levels going north show coal of good quality. It is reported that not far from the northwest corner of the old General

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Mining Association's area, a coal outcrop has been found. If it dips toward Springhill it will complete the structure of a basin. If the dip should be northward the Springhill Basin is either complete or the northwardly dip of the crop would show that there is in Springhill a basin subsidiary to the great basin of the coal-field. As these mines give off more gas than in former years, the management are introducing safety-lamps at several points.

The Chignecto Colliery worked steadily during the year, the output being 18,572 tons.

At the Joggins Mines the output was 45,411 tons, and it is expected that this amount will be exceeded this year.

The Minudie Mine worked a little during the first of the year, and was re-opened towards its close.

Mr. Sharp and others prospected on several seams of coal lying east of the Styles Mines, which were named the North, Bottle Glass, South, New, and Nine feet. The quality of the coal exposed appears to be good—and the tracing of coal seams in this direction adds materially to the known extent of the coal field.

The sales to the Province of Quebec from this county were 177,461 tons, compared with 182,927 tons during the year 1888.

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### PICTOU COUNTY.

The total sales were 383,482 tons against 418,893 tons in 1888, and 339,034 tons in 1887.

The home sales were 247,708, against 228,805 tons during the preceding year.

The Province of Quebec took 73,261 tons, compared with 114,382 tons in 1888.

The Acadia Company raised 269,607 tons, and the Intercolonial Company raised 125,957 tons. The output of the Black Diamond Colliery was 34,015 tons.

At the Intercolonial Colliery arrangements were made for working the coal in an adjoining area belonging to Mr. S. H. Holmes, included between the line of the Intercolonial Company and the supposed southerly extension of the McCulloch Brook fault.

The drift referred to in my last, as started in the Black Diamond Company's mine, to test the underlying measures, met heavy feeders of water, and was abandoned. A dam was put in to keep the water from finding its way into the Acadia Co.'s workings.

Mr. Maddin, in his report, refers to the fire in the Vale Colliery at the close of the year. There is no direct evidence as to the cause of the fire, and apparently it must have been due to the heat caused by the steam pipes. Some months ago, in the Maurice Wood Colliery (England), under circumstances apparently the same, a similar fire took place—unfortunately involving the loss of 64 lives. A lengthy enquiry was held, but no satisfactory results were reached as to the cause of the fire.

The injury inflicted on the Vale Colliery by this fire brings up again the question of the adaptability of the Mines Regulation Act to all the problems arising in the course of working our coal mines. The law provides certain regulations of an excellent character, general in their provisions and adapted to all mines, more particularly in respect to examination, use of explosives, etc. In regard to other matters not specially provided for the Inspector may require that changes be made. If his opinion be objected to recourse may be had to arbitration. Our Act containing this provision is copied from the English Act.

This provision in the English Act is presumably intended to meet the wide divergence which exists as to what is good and what is bad mining practice in any particular matter. In the case of the English coal mine lands it must in this connection be remembered that they are owned by individuals, and are transferred and leased free from any government control. It is, therefore, easily seen that the government, admitting to the fullest extent the right of an individual to work his mine as he thought proper, confined itself to enactments more directly affecting the personal safety of the miner, and left the questions of modes of working to the self-interest of the owner.

The position of matters in this Province, however, is somewhat different. Here the Government is the direct owner of the coal, and as such it is a question if the interference in the conduct of the mines could not be advantageously carried a step further. There are many points which are matters of disputed practice, there are certain safe general principles, and there are mining operations in accordance with good mining practice, which are with reason open to serious objections. I may mention here the time when open lights should be superseded by safety lamps, the moment when the use of gunpowder should be abandoned, the use of furnaces underground, the connection of one or more seams by the same shafts, the retention of reserve blocks of coal for future sinkings to deeper seams, etc.

Should the duty of drawing the line of safety in these and similar questions be left to impartial hands, there is no doubt that in some mines rules could be laid down which would increase the safety of working, and assist in preserving the store of coal. The enforcement however of these rules would be met by the statement, which has good ground in fact, that the increased cost in mining would destroy any profits or lose a market. This brings the subject to a crucial point: Is public opinion willing that a mine should be closed? That

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for a term of years no royalty should accrue? And that some scores of men should not find work in it, and in so doing be satisfied that it is not too dear a price to pay for the assurance that an effort is being made to preserve so important a resource? It is a question if, broadly speaking, the general interests of the Province would not be benefited by stricter enactments, even if they led to greater costs of mining and their consequences. Or must the present state of affairs continue where we see gaseous, or heavily watered, or pitching seams, with their necessarily heavy cost sheets, competing in market with coals mined under every natural advantage? There is not only a temptation in the case of the former class of mines, but almost necessarily a time comes when renewed expenditure for equipment becomes impossible, and a mine goes staggering like a disabled ship because the price got for its coal is not in proportion to the cost of getting it. When this stage in the history of a mine is reached, it is exposed to attacks from natural causes as well as to those due to the imperfection of the ordinary man. This unequal contest between mines is not confined to this Province; it is seen everywhere, and while the philosopher may complacently regard it as a good example of the law of the survival of the fittest, the economist regrets that the contest is too often marked by the wrecks of mines that should not have been wrecked, or whose workings should have been suspended until conditions of trade allowed fair returns.

I am informed that in Germany this question has received some attention, and that regulations are made applying to districts, groups of mines, or even to individual mines, so that there is always present a factor in favor of safety against cost, and a retention of the coal against its present and often profitless extraction. I may add that this view of the matter was brought before the special committee appointed by your Honorable House of Assembly session before last.

I append Mr. Maddin's report on visits to the collieries of Pictou and Cumberland during the year last past:

WESTVILLE, N. S.,

Dec. 31st, 1889.

E. GILPIN, ESQ.,

*Inspector of Mines, &c.*

DEAR SIR,—I have the honor to respectfully submit herewith a summarized and condensed statement of my official work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland for the year ending the 31st day of December, A. D., 1889.

INTERCOLONIAL COAL MINING COMPANY, WESTVILLE, SLOPES.

*Nos. 1 and 2.*—Work in this mine has been for some time attended with some degree of danger, owing to a "creep" which seemed to imperil the safety of some portions of the mine. I am of

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opinion that the danger of that is past, as no indication of any serious nature has been seen for the past few months in the year, and a large percentage of coal is now being successfully won. The air is kept well up to the workmen, of which, as see per return, a very large volume circulates in this mine.

SCOTT PIT.

Work has not been carried on to any large extent in this mine. During the latter portion of the year (12) twelve men were started to work with a view to pierce through a fault in the east side, and there test the quality of the coal. This was done, and the coal proved satisfactory, the fault being an upthrow of some 16 or 18 feet. Since that time no work has been done.

ACADIA COAL COMPANY, LIMITED.

*Acadia Slope, Westville.*—This slope is now down a distance of 3560 feet, a new lift having been sunk this summer of 440 feet. A considerable quantity of gas is met with in this lift, but every precaution as hitherto is taken to guard against every possible accident. No powder is used in the new lift or in any portion of the mine. A new overcast airway, as well as air returns, are completed, and a steady flow of air circulates freely round the different portions of the mine. The air and regulations were all that could be desired.

*McGregor Pit, Stellarton.*—This pit has been kept steadily to work all the year, and the workings extended to the deep. The North Slant, which is down now a distance of 2,760 feet at the top dip at an angle of 16°, and at the bottom 25°. I made several tests during the year in the air returns as to the percentage of gas contained. Considerable precaution has to be exercised in this mine, the coal being inclined to evolve gas. I have much pleasure in saying that the air was kept well up to working faces, and at no time in such places was there any indications of gas; however, in the returns I found percentages of 1½, 1½ and ½. Pillar working, which in all mines is attended with danger to the immediate workmen, has been prosecuted successfully, and a very satisfactory percentage of coal is being had.

*No. 1 Slope (Stellarton).*—Has been for a considerable portion of the year under repairs and pumping the water out. A new pump and boiler have been placed in position and set to work.

*English Slope (Cape Pit Seam, Stellarton).*—At my last report was down 700 feet, and at date is down about 1700 feet. During the latter part of year some gas has been met, and, in consequence, safety lamps are used. In the distance gone down two-fourths have been encountered in the coal measures.

*Foord Pit, Stellarton.*—After much perseverance and difficulty they have succeeded in clearing the bottom of the Square Pit, and getting their large pump in effective condition. Very serious obstacles

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have been met and overcome in doing this much, and we trust that ere long this fine mine will again be in working order.

I might say here that no serious accidents have occurred during the progress of this undertaking, with the exception of one or two slight casualties ; nothing to injure either life or limbs.

*Vale Colliery (Thorburn)*—The McBean improvements have been made during the year in the air-passages, by making connections between 2600 feet level and 1800 feet level, thus decreasing the distance air had to travel, and consequently increasing the air current around working faces. I regret to say that an accident, fortunately attended without loss of life, but involving a serious loss to employers and employes, occurred on December 23rd. At that date symptoms of fire were discovered in the pipe head, 800 or 900 feet from surface; immediate exertions were made to extinguish the fire, but unfortunately although every effort was made they were unsuccessful, and were compelled eventually to close up all openings into or from the mine. A matter worthy of notice here is that in closing up the mine no explosion followed; in all or nearly all former cases of this kind the closing up of a mine on fire has caused or been attended with an explosion subsequent to such closing. The method adopted, was first to partially close the outlets, next one in-take, of which there are two, then slow the face to half speed, next to partially close the remaining in-take, next close the outlet completely, remain 20 minutes, then completely close the in-take. Every praise is due to the employes for the heroic and untiring efforts they made in the attempt to save the mine.

#### EAST RIVER AREA.

*John Muir & Sons.*—A few men have been kept at work on this area for the most part of the year. As only a small business is done no extensive work of any kind is carried on. One balance has been worked out, and a new one started some 300 feet inside of the old one.

#### SPRING HILL MINES, CUMBERLAND CO.

The New Slope, No. 5, at (600) six hundred feet, pierced the West Slope seam. They continued sinking to about 1300 feet, and are now driving levels to connect with 1900 feet levels in East Slope. A considerable quantity of gas is given off in the working, and in consequence the management are using the safety lamp in the work.

*East Slope.*—Levels have been extended during the year, and evolve considerable quantity of gas. They began to extract the pillars in the 1900 feet level in August. In the return airway I have found gas in Indicator to read 1 and 1-10 per cent., and at other other times 6-10. A tunnel has been driven from the level on this lift to North Seam, and some gas has been met with in this part of the mine. During the summer the airways were enlarged and the volume of air increased.



*West Slope.*—Principally pillar work done here during the year. On the West side some gas is met with, which appears to exude from a small overlying seam, and in taking the pillars away small fissures or openings are caused in the roof, and permits the gas from said small seam to escape into the workings. A very large per centage of the coal is won.

*North Slope.*—The North Slope has been sunk 600 feet from bottom of Bore-Hole, previously reported and levels turned away, and the coal lifted up to the 1300 feet level. The levels have been extended 600 or 700 feet east and west. Gas has been met with in this new lift. During the year it was decided to put in 3 dams, viz., in Travelling Slope, Main and Pipe Slopes, and to flood to extinguish the fire in South Slope. At my visit in December, the slope was opened, and the fire appears to be extinguished.

#### OXFORD.

I ascertained in April that a mine had been started some short time previously near Oxford Station. I visited there on the 24th of the month, and found a slope down about one hundred feet, and the owners then purposed boring, but as yet have not done so.

At Londonderry on October 4th, a man named Scott Hillen was killed in the shaft by being caught with the cage.

#### JOGGINS.

In April they began sinking a new lift in the slope, and also drove a place to surface from the top-lift for an airway. They are now down a distance of 600 feet, and have levels driven in some distance, and a back balance completed. In extending levels on 1500 feet lift they crossed (3) three dikes or troubles in the coal measures, two down throws and one up throw. The coal is now pretty well extracted from old lift, and owing to so many faults on 1500 feet lift the output of coal has been retarded. The work is now in fair order, and we may reasonably anticipate the output to be materially increased next season.

#### CHIGNECTO.

The management have driven a plan from the present lower lift out to the surface on east side of mine, inside the old original fire, and are using it as a return airway and travelling slope, and during the latter portion of year have begun operating on the east side of mine. Some small fires during the year have originated from spontaneous combustion, but have been all built off and appear to have died out. They have been extracting pillars, but the angle or dip of the coal being so steep makes it a rather difficult job in this mine.

Ventilation has been always satisfactory.

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S. E. FREEMAN.

The water is completely extracted now from this mine, and 9 or 10 men started to work. The ventilation, although only natural, has been always satisfactory. A new engine has been put up and several new buildings erected.

MINUDIE.

Done some work in the beginning of the year, but were idle for a part of summer. They began work on November 12th, and at this time have 10 men at work underground, and attain an output of 20 tons per day.

BLACK DIAMOND MINE, WESTVILLE.

In January they began drawing the pillars to the rise, and extending the bords westerly to the dip, and subsequently began drawing the pillars in the lower lift. At present it is all pillar work which is being done very well. The tunnel mentioned in last report driven to test underlying seam was driven about 120 feet, when they struck some heavy feeders of water, they then stopped driving and put up a wooden dam (3) three feet thick to prevent the water escaping into the workings, as they connect with the Acadia Mine and were causing them trouble and expense to keep the water out. The wooden dam proved too weak to sustain the pressure, which is calculated to be about 300 lbs. to sq. in. A brick dam 2 ft. thick with 16 inch of a curve was subsequently built and likewise proved too weak. A third dam is now under course of construction; it is built in two sections. The inside section is 16 inches thick from pavement to 3 feet high, thence 12 inches thick to roof 5 feet; a space of (3) three feet is left when the outside section is built (3) three feet thick. Clay is rammed in the space between the sections. At my last visit the work was not completed.

Some small prospecting was done by Wm. P. McNeil, on the area lying immediately north of the East River area.

I herewith append the usual statements in tabulated form.

I remain, your most obedient servant,

WM. MADDIN, JR.,  
*Deputy Inspector of Mines.*



OFFICIAL VISITS, YEAR 1889.

MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Intercolonial } Slopes 1 and 2 .....	16	11	5	11	6	8	5	17	13	17	8	4
Coal Co. } Scott Pit.....	Idle	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	4
Acadia Coal } Acadia Slope, Westville. .	9	8	25	8	6	7	2	16	10	18	5	2
Company, } McGregor Pit .....	10	6	9	5	4	4	8	8	11	5	6	3
} No. 1 Slope .....	11	6	8	5	4	4	2	6	9	.....	.....	.....
} English Slope. ....	11	5	6	4	3	3	2	6	9	.....	Idle.	.....
} Vale .....	15	12	13	13	7	15	9	2	14	21	21	19, 23 24, 26
Spring Hill .....	{ 22	21	19	18	{ 16	{ 19	17	21	{ 16	{ 9	{ 13	12
	{ 23	23	20	20	{ 17	{ 20	19	22	{ 17	{ 11	{ 14	13
					{ 18			22	{ 21		{ 25	
Chignecto.....	21	26	22	23	22	21	30	22	21	8	12	11
Joggins .....	22	25	21	22	21	22	29	23	24	8	12	10
Londonderry .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....
Oxford Station .....	.....	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....
East River Area—John Muir & Sons ..	15	12	13	13	7	15	9	12	14	21	21	19
Black Diamond .....	30	.....	{ 4	6	9	6	6	7	12	1	4	3
			{ 25		Idle	until						
Minudie Slope.....	.....	.....	25	21	21	24	.....	.....	.....	.....	12	9
Lawson Mine—S. E. Freeman ....	22	25	20	25	21	24	30	22	24	8	11	11

ACCIDENTS, YEAR 1889.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	January 26.....	McGregor Pit...	John Baker .....	Loader.....	Leg broken, jammed between box and prop.
2	March 2 .....	East River Area	Wm. Wylie .....	Miner .....	Collar bone broken, falling coal from face.
3	" 5.....	Spring Hill.....	James McCarthy ..	" .....	Leg broken, fall of coal north slope.
4	" 29.....	" .....	Dan. Bigny .....	" .....	Head injured, fall of coal.
5	June 1.....	" .....	Mat. McLeod .....	" .....	Foot badly injured
6	July 19.....	" .....	Alex. Wilson.....	" .....	Burned by gas, slightly.
7	" .....	" .....	Daniel McSaveny..	" .....	" " "
8	" 26.....	Vale.....	Fred Dougherty ..	Driver.....	Leg broken between two boxes.
9	September 3.....	Spring Hill.....	Michael Dunn .....	Miner .....	Foot injured, fall of top coal.
10	" 4.....	Londonderry ..	Scott Killim .....	" .....	Killed, caught in shaft by cage.
11	" 16.....	Spring Hill.....	Duncan Cameron..	" .....	Burned with gas, slightly.
12	November 4.....	Joggins.....	Amos White.....	Driver.....	Killed, struck by rake in slope.
13	" 17.....	Spring Hill.....	William Yarson ..	Miner .....	Leg broken by fall of top coal.
14	December 19.....	" .....	George Yarson.....	Overman .....	Burned with gas, east slope.
15	" .....	" .....	John McLeod .....	Miner .....	" " "
16	" .....	" .....	Sam. McLeod .....	Loader.....	" " "

*Volume of air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines, 1889.*

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**CAPE BRETON CO.**

The total sales for this County were 751,997 tons against 738,250 tons in 1888, and 715,442 tons in 1887.

The home sales were 200,182 tons, compared with 190,508 tons in the year 1888.

The sales to Quebec were 381,074 tons, against 381,012 tons during the former year.

The United States took 5,333 tons of round coal, and 13,733 tons of slack coal against 2,685 tons of round and 21,098 tons of slack coal sent there the year before.

The manufacture of coke at the Gowrie has been continued, and I understand that the quality of the article is satisfactory. In connection with the fact that coke can probably be made as cheap, if not cheaper, in Cape Breton than in any other part of the world, the following remarks by Mr. G. G. Andre, published in the *Colliery Guardian* (English), are of interest :—

“ It sounds more like fable than fact to talk of importing coke from America ; but there is, nevertheless, a prospect of seeing a good deal of United States coke shipped for the European markets in the course of the next six months. The project is under serious consideration, and a little reflection is sufficient to show the scheme to be feasible. The price of blast furnace coke in Germany is from 20s. to 21s. a ton at the ovens. In Belgium the same price has to be paid, and in France the rates are moving up to the same level. At the present time coke in the United States is exceptionally cheap, so that there is a sufficiently wide margin for freight and profit. The price of blast furnace coke in Pittsburg is from 5s. 6d. to 7s. a ton. On a margin of 14s. something might be done in the way of profitable trade. I learn from a trustworthy source that the attempt will certainly be made. Already the arrangements are in an advanced stage of preparation.”

The production and sales of the various Cape Breton collieries during the past year was as follows :—

	Production.	Sales.
Bridgeport .....	21,496 Tons.	24,222 Tons.
Caledonia.....	114,299 “	102,980 “
Franklyn.....	4,046 “	4,404 “
Glace Bay .....	80,920 “	73,919 “
Gowrie.....	111,700 “	100,445 “
International .....	123,915 “	118,086 “
Ontario .....	2,866 “	2,604 “
Reserve.....	121,649 “	110,225 “
Sydney .....	144,966 “	123,902 “
Victoria.....	108,601 “	91,120 “

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I beg to submit Mr. P. Neville's report on his work as Deputy Inspector for the Island of Cape Breton :—

BRIDGEPORT, *Jan. 9th, 1890.*

E. GILPIN, JR., ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave to forward a report to you of my inspection through the different mines in the Island of Cape Breton during the year 1889. I also enclose tables of Number of Visits, Air Measurements, and Accidents.

#### SYDNEY MINES.

I made several visits during the year. The new deep, mentioned in last report south of pit bottom, has been driven 26 chains across the old workings into solid coal, the work is expected to be extensive in that section next season. The coal on the north side in what is called Skinner's, is getting very thin in many places, not over two feet eight inches thick. Also, it is getting thin in No. 2 Section, below that. The condenser, which condenses the steam of the two winding engines, is getting out of order, and a new trotting condenser from England is to be put in place of it.

Also they are fitting up a new underground, forcing pump of 36 in. cylinder and 5 feet stroke to force the water from pit bottom, in one lift of about 700 feet, to the surface, and thus take the place of the large Cornish set of pumps. A stone engine house with arched brick roof is being built at the pit bottom for this pump. Our surface tressel work is built to the outer side of the coal yard, and an apparatus put up by which the tubs of coal for banking are drawn out to the bank by an engine. A screen is erected for screening the coal on the outer side of the heap, and a branch rail road to this screen from the main line.

#### VICTORIA MINES.

Work has been brisk for the season. West levels are extended five hundred and fifty yards, and the east levels, four hundred and fifty yards. East slope has been straightened and graded. The length of the slopes at present from the surface to the low levels are about twelve hundred feet. About the first of September at the east side of No. 1 Balance East Slope, two rooms broke in from the roof, letting in a feeder of water which runs about 6000 gallons in twenty-four hours. On the 20th of November, six more fell in. The cause of these rooms falling is, that the roof was not good. As the rooms came in proximity with the fault approaching that point, it would be well to have the pillars larger or the rooms narrower.

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A new Blake pump has been placed at the bottom of the lower lift, which discharges to the upper pump and lodgement. Its dimensions are as follows, cylinder 15 inch; 12 inch stroke, six inch plunger, calculated to throw 130 gallons per minute. A new trolly has been made and placed on the slopes for the men to ride in, ten at a time. The management says they intend to put another on, so there will be one for each slope.

The screens and bank have been roofed and covered in.

#### OLD BRIDGEPORT.

This mine has worked pretty steadily during the season; the coal mined and shipped from there has been chiefly taken from the south side of the headway and workings.

As the rooms extend to the south the band of shale between the two seams gets thin, and consequently the roof gets bad; but I must say great care is taken to have the place well timbered. I understand it is the intention of Mr. Mitchell to have it after this taken down wherever it is thin. The coal seems to improve as the works extend to the south.

Tressel work has been erected over the banking ground, in order to prevent breakage of coal, which I believe is a decided improvement.

#### INTERNATIONAL.

This mine worked pretty steadily during the shipping season. The water coming through the fallen room in No. 7 Section, mentioned in my last report, has decreased from 52 gallons per minute to about 15. A new lift of 600 feet has been gained to the dip; levels turned off right and left at that point.

The coal seems much improved, being more free from impurities and the seam thicker. In order to test the Ross Seam under this area, a slope has been driven into the crop of it about one hundred feet. The coal is five feet seven inches thick, and appears to be a good quality.

#### RESERVE MINES.

I visited regularly every month. The east slope has been driven three hundred and ninety-six feet down; and levels turned off. North level driven six hundred feet; south level driven five hundred feet. In the main or west slope fifteen rooms were worked, some of them driven to the barrier. Six pairs of men to the rise of this were kept splitting and drawing pillars. The old furnace has been pulled down and a new one built in place of it, which is about six inches wider and higher than the old one. The management say that it is their intention this winter to drive the east slope down six hundred feet further in order to gain another lift.

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**LITTLE GLACE BAY.**

There has not been much change in the workings here, except, that the levels on the north side have been driven about five hundred feet into the Campbell area, which I am informed that they now control. Also, the level on the south side of the pit has been driven five hundred feet.

On surface, a new locomotive shed has been built, and the railroad wide gauged from pit to wharf. New four and a half ton cars built and put on the track instead of the pit tubs. The bank and screens have been roofed and covered in. A new shed for a saw-mill built, and a steam saw-mill placed therein.

**CALEDONIA.**

I cannot note any new feature in this mine; work has gone on as usual both to the dip and rise; dip levels have been extended on the east and south side, and rooms worked off; a few pillars have been split and drawn from the south side of the rise workings. On surface, a new No. 3 Manville Windmill and Starr pump has been placed over a well twenty chains north from pit, which supplies the reservoir with water and gives good satisfaction.

**ONTARIO MINES.**

Work has been very slack here this season. In the early part of the season a new level was started at the seashore to gain a better hold on the coal at the inner part of the workings; but this did not prove satisfactory, and it was discontinued.

I understand that Mr. Thomas Routledge has it bonded or leased for a term of years; and that it is his intention to have the lift pumped out and ready for work in the spring.

**GOWRIE MINES.**

The main dips have been driven down seven hundred and fifty feet, which now makes them eighteen hundred feet from shaft level; from that point levels are turned off east and driven nine hundred feet. Also the west levels from the upper dip have been driven three hundred feet, which makes it about eighteen hundred feet from the landing.

A pair of slants is being driven from the level to come out on the west level near the pit bottom. The coal from the west side is to be drawn up this slant next season; a new pump has been placed at the bottom of the low lift, which delivers water from there to the lodgement and pumps of No. 1 deep.

In conclusion, I regret to have to report so many fatal accidents; you will observe that the most fatal class is caused from fall of loose

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coal while working under it. The control of this is chiefly in the hands of the miners, if they would only attend to it ; this danger would be avoided by putting wooden sprags under or against the coal where and when required. I am of the opinion that until an Act is passed by the Government compelling by fines or otherwise the use of wooden sprags that this class of accidents will go on in all the mines in Cape Breton. The general rule is that two men work together in each room or board ; it seldom or never happens that both are caught at the same time by falling coal. If an Act was passed compelling the use of sprags, and if a fatal accident of that kind happened, then the uninjured one could be held responsible for a breach of the law.

I remain, your most obedient servant,

P. NEVILLE,  
*Deputy Inspector of Mines.*







## ACCIDENTS.

DATE.	NAME OF MINES.	NAME OF INJURED.	Occupation.	Age.	REMARKS.
Jan. 12 . . . .	Victoria Mines . .	Alex. Nickeloson .	Driver . . . . .	14	Fell in front of full boxes; while getting off at landing, one passed over him. He died next day.
March 12 . . . .	" . . . . .	Edward Hall . . . .	Road Maker . . .	68	While walking up balance, was struck and killed by full coal box going down.
May 24, . . . .	International . . .	Antony McNeil . . .	Driver . . . . .	16	Head bruised and cut by fall of loose coal from face of hanging junk.
June 8 . . . . .	Sydney Mines . . .	Charles Tutty . . . .	Miner . . . . .	21	Leg broke by fall of loose coal from face of room. Leg amputated twelve days after.
" 17 . . . . .	" . . . . .	James Jones . . . .	Driver . . . . .	14	Killed by explosion of fire-damp while hauling timber in rooms.
" " . . . . .	" . . . . .	George Jones . . . .	Driver . . . . .	16	Burned by do. do. do.
July 9 . . . . .	Reserve Mines . . .	Hugh McDonald . . .	Miner . . . . .	38	Killed by fall of loose coal from face of junk while at work in his room.
Sept. 23 . . . .	Sydney Mines . . .	John Vicars . . . . .	Miner . . . . .	28	Injured by fall of loose coal from face of room. Died twelve days after from injuries.
October 8 . . . .	Victoria Mines . . .	Ambrose Laffin . . .	Miner . . . . .	20	Killed by fall of loose coal from face of junk in room while hauling.
" 18 . . . . .	Gowrie Mines . . .	Neil Johnstone . . .	Miner . . . . .	29	Back and shoulder bruised by fall of stone from roof.

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**COAL—MISCELLANEOUS.**

*Cumberland Co.*—During the past year explorations were carried on to the East of the Styles mine by Messrs. Sharp, Hickman, *et al.*, and several seams said to vary in thickness up to eight feet were discovered. The coal is of good quality, and the results of the explorations, it is claimed, prove the extension of the Cumberland coal field for a considerable distance east of the limits hitherto generally assigned to it. Discoveries made to the Northwest of the old General Mining Association area appear to show an anticlinal, having the Springhill Basin to the South, and the Maccan and Styles Basin to the North. If these results are confirmed a much greater portion of the Cumberland coal field will be accessible to the miner than has hitherto appeared possible. Some little work was also done in tracing the Oxford seams, which appear to form a basin, having a general East and West course.

*Colchester Co.*—At Coal Brook, about 12 miles from Truro, Mr. George Ross, of Truro, secured a lease, and has opened a seam of coal of good quality, said to be 3 feet 9 inches thick. Some prospecting was also done at Middle Stewiacke.

*Pictou Co.*—I am not aware of any discoveries of coal during the past season. Mr. H. R. Fletcher, of the Canadian Geological Survey, well known for his report on the Sydney coal field, devoted much of his time last year to the Pictou coal field, and as he has had access to all sources of information it is expected that his work will throw light on some of the disputed questions about its structure.

*Cape Breton Co.*—Mr. Greener has continued his explorations in the vicinity of North Sydney, in the measures lying on the prolongation of the Low Point coal strata. From analyses made of two of the seams by Mr. Maynard Bowman, Dominion Analyst, they are of excellent quality, when it is considered that the samples were taken from the outcrop, the per centage of ash running as low as 2.06, and of sulphur less than one per cent. Toward the close of the year I understand that Mr. Greener drove in some distance on one of the seams and found that it was thickening, and was then 5 feet 3 inches thick. The importance of the discovery of a workable seam of good quality at this point is apparent, for a large tract of coal-bearing measures becomes proved, and encouragement is given to others to search outside the hitherto recognized limits of the Sydney coal field. Explorations were also carried on in the district west of the Gardiner Mine and a license to work selected.

The total receipts from licenses to search, licenses to work, and leases was \$8135.00.

The rental law went into operation June 17, 1889, and since that date thirty-six leases have been applied for, and six applications have been made by lessees to bring their leases under its application. The

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total number of square miles thus placed under the rental law is forty-five, which may be counted upon as yielding an annual addition to the Mines Revenue of \$1350.00. The number would have been larger if a number of holders of licenses to search, applied for before June 17th, had not exercised their privilege of selecting rights to work instead of leases.

*Wire Ropes.*—In my last report reference was made to the Elliott Improved Combination Locked Rope. One system of making these ropes comprises a central strand of seven round wires, around this eleven other round wires are spun, and then follows two coverings of wedge shaped wires, the first having twenty, and the second twenty-seven wires. Outside of all comes a locking coil of thirty-four sectional wires. This rope has the appearance of a rigid bar, but it possesses abundant flexibility. Some of the advantages claimed for this rope are that the whole surface of the rope comes in for wear and the effects of friction are much less than in the common form of rope.

One of these ropes,  $\frac{3}{4}$  of an inch, replacing a  $1\frac{1}{4}$  steel rope, was in use at the Vale Colliery for a year and a half without showing signs of wear, and was reported as not being half as hard in pulleys and rollers as those of the ordinary make. I am informed that, at the Acadia Colliery,  $\frac{1}{2}$  inch ropes of the Elliott pattern have been purchased for use on back balances, to replace  $\frac{3}{4}$  inch ropes. The Deputy Inspector considers them an improvement in the ropes at present used in his district in every respect.

Mr. T. H. Deakin's remarks on the treatment of ropes:—

“Under this head I would call attention to the fact that rope manufacturers pay a high rate of railway carriage, to ensure the rope being kept dry and conveyed with care to its destination. It is equally necessary that in arriving at the colliery it should be stored in a house where it will be kept perfectly free from wet, steam and noxious fumes. I have heard of a rope suddenly breaking after being in work but a short time, and when there appeared to be no apparent reason for the failure, unless it be that it was kept at the colliery stores for a long time prior to its being put to work. If ropes are kept in stock any length of time, they should be in the dry and turned over and oiled from time to time with a good and pure oil, to insure them against rust. When wanted for work, the rope should be placed on a turn-table or reel so that it may be uncoiled. If treated in any other way the strands are certain to be more or less opened, and there is great risk of damage to the rope by kinking; and if a slight kink is once made, that portion of it is irretrievably damaged. The rope having been kept free from rust while in the stores, it is important to keep it so as far as possible whilst in use. This can best be done by making up a thick oil, and as the rope is being wound slowly on to the drum, and before it becomes wetted, this mixture should be applied and care taken to work it well into the crevices of the rope, so that it has the appearance of a solid bar,

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Ordinary rope oil should then be applied for a few days consecutively, and afterwards, under ordinary conditions, an oiling once a week will keep it in good order. If this course is adopted it will be found to add immensely to the life of the rope. Some people object to having the ropes greased, because they say broken wires cannot be detected; but I, for one, do not subscribe to this doctrine. Ropes will, of course, stretch considerably on being first put to work, and for a time the engineman should be careful to start gently, so as to feel the load before putting on much strain."

Mr. W. Fairley, President of the South Staffordshire National Organization of Colliery Managers, thus sums up the reports of the English Mines Inspectors with relation to explosions:—

(1.) The non-occurrence of explosions in the Durham district was probably due to the good discipline enforced there, for certainly there was no lack of firedamp in the collieries in the district. (2.) That there was much danger in shot firing was proved by fires in South Wales and Cumberland, by which thirty-five lives were lost; and Mr. Wynne said that to do away with blasting in fiery mines would be to abolish explosions altogether. (3.) That it was dangerous to drive winning-places, especially in places in advance of the air, was proved again by the explosion which occurred at Deckham Hall Colliery. (4.) That there was a danger in men leaving their own places of work and rambling to other parts of the pit was proved by Mr. Wynne's and Mr. Wardell's reports. (5.) "Waffing" gas out of a pit was again proved to be dangerous by Mr. Ronaldson's report. (6.) The placing of scaffolds in shafts, and leaving the part below unventilated caused much danger, as had again been demonstrated by the explosions at Shaw Cross and Essington Farm Collieries. (7.) It was dangerous to make the sinking shaft a return, was proved in the accident which occurred at Newmarket Colliery, and which was reported upon fully by Mr. Wardell. (8.) The Clanny lamp was not safe under all conditions, the explosion at Newmarket having occurred through it. (9.) Gas was liberated when a heavy weight of the roof caused a fall, as was seen by the case which occurred at Lea Green Colliery in the Liverpool district. (10.) In no case of explosion had there been shown to be any connection between the weather and the occurrence. (11.) Want of discipline, or scarcity of ventilation, had in many cases been the cause of explosions, as would be seen by the reports of the inspectors, particularly the breach of the general rules 1 and 4. (12.) Coal dust added much to the danger of explosions, as was shown repeatedly in the reports of the inspectors for South Wales and Yorkshire. (13.) Some of the explosions would not have happened had safety lamps been used. (14.) Upcasts should be kept dry, as was seen by the occurrence at Pillowell Level Colliery, Forest of Dean. (15.) Fires and furnaces should not be placed underground, as was shown by the same occurrence.

Mr. Joseph T. Robson (South Wales Inspector) remarks that, with

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one exception, the explosions in his district, both fatal and non-fatal, occurred in mines where naked lights were in general use, and states that: "Most of them would certainly not have happened if safety lamps had been used, but many owners and managers are still averse to the introduction of safety lamps, because the quantity of gas generated in the naked light collieries is comparatively small to that in most of the collieries worked exclusively with safety lamps. These owners and managers rely on the ventilation and the inspections by their subordinate officers, and have an impression that a dangerous quantity of gas is not likely to be met with. The prohibition of naked lights under the eighth general rule cannot be enforced by an inspector, unless he can prove that there is likely to be such a quantity of inflammable gas as to render the use of naked lights dangerous. Now, similar conditions exist in mines worked with naked lights as in those where only safety lamps are used; the ventilation is conducted on the same principle, and is equally liable to temporary derangement whereby gas may accumulate. The small explosions which occur are, in my opinion, sufficient proof of the likelihood of gas being met with. Then, as to the 'dangerous quantity,' it seems to me that where the system has failed, and an explosion, resulting in serious personal injury or loss of life, occurs, this also is proof of the danger, and that only safety lamps should be used. This view of the matter has not, however, been upheld in cases of prosecution in other districts, and I have not, as yet, thought it advisable to recommend proceedings under the eighth general rule. I am confident that safety lamps will become more and more into use as a precautionary measure, which, of course, is their only legitimate purpose."

Among the safety winding appliances exhibited at the Paris Exhibition may be mentioned the Villiers Safety apparatus, which is thus described:—

The object of this appliance is to prevent all accidents from overwinding, whether the speed be too great on arrival, whether the banksman makes a mistake in the direction on starting, or indeed under any circumstances. The effect is, progressively, and in an automatic manner independently of the banksman, to reduce the speed of the winding engines (the momentum of which is frequently excessive owing to the weight of the ropes being often very great) and to bring the cages to rest without shock, should they pass the landings. Such an appliance has given good results at the Jabin shaft during the last three years, and a second has been put up at the Verpilleux shaft.

To bring about this result the winding engines are fitted with a brake of progressive action, capable of moderating the speed during a certain period, and of causing complete and instantaneous stoppage at a given moment. This double-acting brake, worked by a slide within reach of the banksman, is put on by a weight suitably circulated, and taken off by compressed air admitted below a piston.



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The compressed air, admitted above the same piston, doubles the energy of the appliance, which thus, from being simply a moderator of speed, then becomes a means of complete stoppage. The use of compressed air is preferable to that of steam, which is liable to condensation, and therefore, being evacuated with difficulty, renders the putting on of the brake too slow. The counter-weight brake guarantees against accident owing to the bursting of a pipe, because in such a case, like the air or vacuum automatic railway brake, it acts immediately, and clips the brake pulley. In order to avoid producing a too great and therefore dangerous effort on the brake, care is taken, when admitting compressed air on the top of the piston, that it be of constant pressure, which it is possible to obtain by a reducing valve. The brake, on working, at the same time closes a steam stop-valve, between that worked by the banksman and the boiler. The valve, however, although closed, allows a certain defined amount of steam to pass, so that the engines may have some to work with on the brake being taken off. Besides this the engines are provided with a *servo-moteur*, or steam starting and reversing gear, by which this latter operation is effected with little effort. The starting lever of the *servo-moteur* acts as the slide to a vertical catch or trip, articulated to a rod sliding on the reversing lever, which is operated by the *servo-moteur*. This rod participates in the vertical motion of the catch, and in the oscillating motion of the reversing lever, in which movement its lower end might, if not raised, draw along any object placed in its way. With this addition the engines may be slowed with certainty.

*Water Columns.*—A new form of pipe for conveying iron-destroying fluids, such as acid mine waters, sulphuric acid, wood pulp from digesters, etc., is now manufactured under the patents of J. C. Bayles of New York. The steel-armored acid conduit is a light and strong steel pipe, built up of sections of such shape as to give it the maximum strength and stiffness, and provided with a lining of rolled lead, so held in position between the externally projecting longitudinal flanges that it cannot collapse or become displaced. The combination of lead and steel thus secured meets the requirements of service in the conveyance of fluids which do not attack lead, but which need to be handled under pressures which lead pipes will not carry. This principle of construction is applicable to various diameters and shapes of pipe, and admits of the use of any weight of metal needed to give the strength required in engineering practice. The steel-armored acid conduit is claimed to make a good pump column for mines from which sulphurous water is discharged: and in other positions where strength and stiffness are needed and a lead lining has value, such a combination pipe would seem to have utility. All forms of lead-lined couplings and special fittings are provided, and full guarantees are offered by the manufacturers as to strength of tubes and tightness of seams and joints. The rapid destruction of iron pipe by sulphurous waters entails so great a cost upon the mining and manufacturing industries of the country that this light and strong acid conduit is an



important addition to the materials at the command of the engineer. The pipe is made by the Spiral Weld Tube Company of East Orange, N. J.

*Fires in Mines.*—The following editorial from the *Colliery Guardian* is of interest to all mine managers who are compelled to leave masses of coal under ground :—

“ This subject is frequently under discussion at meetings of mining institutes throughout the country, and further information is eagerly sought by mining engineers who have daily to face difficulties arising from gob fires, for it is not generally known how large a number of mines have this danger constantly present in them. The matter will receive fresh interest from the recent disaster at Longton, which has been attributed to spontaneous combustion, or what mining men usually call “gob.” The original cause of a gob fire is often a mystery. Frequently it results from the oxidation of iron pyrites, which occurs in thin bands, balls or strings so finely distributed that not only is the coal rendered useless commercially, but the pyrites is also useless in itself, as it cannot be separated from the coal at a price to pay for the labour expended. Where the pyrites is found in large pieces it is separated from the coal, and finds a ready market at the chemical works. Living as we do in an age when residuals represent a large item of profit at gas and iron works, it might be found profitable to send out the pyritous coal, and by crushing and washing separate and convert the one into acid and the other into briquettes or coke.

“ But this would not in all cases obviate gob fires, as the pillars of solid coal which are left at stated intervals in all mines worked on the stoop-and-room or pillar-and-stall system, and also more solid blocks of coal on the sides of main roadways, are liable to become ignited by the excessive friction resulting from crush, grinding or creep of the roof and floor. Thus a solid pillar of coal left as a fire barrier or to effectually exclude air from a gob already heated or on fire has often been so crushed by the weight of the superincumbent strata that the friction of the particles of coal and pyrites against one another have ignited the coal, causing a fire of greater intensity than the original one. That owners recognise the importance of having the best advice in such cases is frequently exemplified in advertisements for managers where the fact is stated that the applicants must have a practical knowledge of how best to work mines liable to gob fire. This, on the principle that prevention is better than cure, yet there is no invariable rule by observing which a manager can keep the mine under his charge absolutely safe from gob fire.

“ Under the head of prevention, ventilation takes the leading place, and that in two forms ;—(1.) By having a large current of air, and (2) by having the smallest current possible to keep the gob clear from gas. The large current will be cool and dry, whereas the small current is certain to be hot and saturated with moisture. The former

tends to lower the temperature of the gob and the latter to increase it.

"It has been noticed in the case of mines ventilated by furnace and where the fires are let down at week ends and holiday times, that the frequency of the gob heating has been very marked, and also that where fan ventilation has been substituted for furnace, gob heating has decreased in frequency. The improvement effected by the latter system is the result of a more regular current of air, which keeps the surface of the gob dry, whereas with a sluggish current the air becomes saturated with water, which is deposited on the gob in the form of dew and afterwards covered up by the colliers, thus providing the conditions necessary to spontaneous combustion. A small current should therefore not be adopted unless a gob fire already exists, a good dry air current being the best preventative, coupled with care in the day-to-day management of the mine.

"A question arises, however, as to the direction of the air-current. If we follow the rule generally accepted, the air-current will travel continuously up-hill until it reaches the highest point, and then return as directly as possible to the up-cast. By following this rule the heat created by fermentation in a gob at the bottom of the hill would be carried upwards from gob to gob, and always increasing; the tendency of the air pressure being to force the heat upwards from gob to gob through the gob, and not by the open airway. Thus, starting with a cool and dry air-current at the lowest point, the gob at the highest point of the workings would naturally be very hot and very damp, and in a condition to foster a gob fire. If on the other hand the air current is brought downhill—i. e., from the highest point to the lowest—the tendency will be for each gob to exhale its own heat into the main airway, and thus all the gobs from the highest point to the lowest will be of a more uniform heat.

"When a gob has developed a fire it is necessary to do something to put it out, and the usual—indeed, often the only—course is to make close stoppings, but in spite of care and ingenuity in their construction there is no case on record where this method has been effectual in actually smothering a gob fire. In fact, a fire once started seems almost to require no more oxygen to foster and propagate it. Mr. Wardle, in his *Reference Book* for colliery managers (third edition), page 250, gives directions for putting in fire stoppings with safety, the principal of which is to always commence with the outlet and not with the inlet. Water has often been tried, but if it is not applied in large enough quantities to completely deluge the gob it is worse than useless. In small quantities it feeds the fire, becomes decomposed by the red-hot cokes, and feeds the fire with its component gases—oxygen and hydrogen. Not only so, but water sparingly applied carries air to the fire, which it forces to the outside and surface with surprising energy.

The most effective way to deal with a gob fire if it is localised is to dig it out. This requires great care when firedamp is pre-

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sent, as the following incident will show :—A small area of coal has been left by a colliery lessee as worthless, but the lessor's agent being of the opposite opinion demanded that a royalty of 10d. per ton should be paid or the coal gotten. The terms of the lease being based on a tonnage royalty, the lessee considered that it would be cheaper to work the coal out than to pay for it or submit to arbitration. The mine was a thick one, with an inclination of about 1 in 4, worked on the pillar-and-stall principle, and had a good roof, hence it was decided to make a road through the old gob. Work proceeded smoothly for some time until it was discovered that the gob was getting hotter day by day the further it was dug into, and at last it was found to be of a dull red heat and only waiting for a sufficient supply of oxygen to break out into flame. The ventilating current was checked and only sufficient air permitted to pass to keep back the firedamp which filled the workings above. A trained man was stationed above the ordinary workmen to watch the gas and to give prompt warning of any danger. In spite of this, on one occasion the gas suddenly descended in large volume, the Davy lamps being filled with blue flame; one man unnerved tried to blow his wick flame out, but providentially the gas tumbled him down senseless, and no man ever received scantier consideration or help from his fellow colliers. Thus the want of nerve or judgment on the part of one man came within measurable distance of creating a fearful disaster, and how many of the recorded colliery calamities have been caused by similar indiscretions no one but those connected with mines can imagine.

“When digging out a gob fire, the safest way is to supply the men with fresh air by means of Denayreuse air tubes, which in no way hinder them in their work, but enable them to do it with comparative comfort and great safety to the mine and their own health.

“Carbonic acid gas ( $\text{CO}_2$ ) has been recommended as a safe means of extinguishing gob fires, but it is very difficult to apply, and when applied would probably be utterly useless as the heated coal would immediately add another atom of carbon and convert it into carbonic oxide, which would burn and be again converted into carbonic acid ( $\text{CO}_2$ ). The aim in building off a gob fire is to smother it by means of the carbonic acid gas supposed to be produced, but unfortunately the gas which comes to the surface is not carbonic gas only, but also carbonic oxide and coal gas, produced by the distillation of coal slack, and, hence, the return ventilating current of a mine possessing a gob fire has a peculiar odour which cannot be mistaken. Air thus charged is very unhealthy, poisoning the blood and producing sickness and headache. If a gob fire gets such headway as to create a large volume of smoke, the danger is very great indeed, for should flames appear, the smoke, being principally the product of the distillation of coal, will at once explode. Explosions of this class happened at Whitfield and Baddesley collieries. Those who cannot realise the possibility of such occurrences may have their doubts removed by watching the gas which is drawn from the top of either open or close-topped blast fur-

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naces burning under the boilers or under the kilns after receiving a proper admixture of air.

“ Although, as before observed, gob fires are so common, yet no rules of the Mines Regulation Act or special rules directly apply to them, and the question may be asked, Is a gob fire “ an open light ?” If it is not it may quickly become one. For instance, in the case of a mine troubled with a gob fire which was carefully built off and in a quiescent state, the deputy passing up the face of work on his last round one Saturday found all right, but within a quarter of an hour the underviewer wishing to meet the deputy passed along the same face and found a prop which had about 2 ft. of dirt against it actually blazing at the foot. This incident only shows that gob fires cannot receive too much attention, and that disaster may result even if every possible means is used to protect the mine against them. In conclusion, it may be well to observe how the Mines Regulation Act, 1887, bears on this question, considering that a gob fire in a locked safety lamp mine is an open light. Rule 1.—That the amount of ventilation shall dilute and render harmless noxious gases. Rule 8.—No lamp or light other than a locked safety lamp shall be allowed or used. Rule 7.—If the person for the time being in charge of the mine or any part thereof finds from any cause whatever that the mine or any part thereof is dangerous, every workman shall be withdrawn from the mine or part so found dangerous, and afterwards such part shall be inspected by a competent person, and a special report made in a special book provided for the purpose ; and under section 42 an inspector may require any matter that he finds dangerous to be remedied even if it is not expressly prohibited by the Act.”

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### SCHOOLS OF INSTRUCTION FOR MINERS.

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Under the provisions of a Minute of Council passed December 15th, 1888, the following persons were appointed instructors for their respective districts. The appointments were dated January 1st, 1889.

#### *Cumberland County.*

James Baird—Chignecto Mines, Macan.  
Robert Redpath—Springhill Mines.

#### *Pictou County.*

J. G. Rutherford—Stellarton.

#### *Cape Breton County.*

Robert Robson—Sydney Mines.  
Robert Anderson—Cow Bay.  
John Weir—Victoria Mines.  
Hugh Campbell—Old Bridgeport.

These gentlemen were authorized, subject to the approval of the Hon. Commissioner, to procure proper rooms for teaching, and were provided with a compass, chain, and a set of plotting instruments, which were to remain the property of the department. No restrictions as to text books or modes of instruction were laid down. As most of the instructors had undergone examinations at the hands of the board of examiners, it was considered that their personal experience in this respect would prove the best guide.

An examination was held simultaneously at Spring Hill, Stellarton, and Sydney, July 17, and the papers considered at a meeting of the board held at Stellarton shortly after. There were papers submitted by fifty-nine candidates. The following passed as underground managers :—

Alex. McDonald—Cow Bay, Cape Breton.	
Jno. Carey—Sydney Mines,	"
D. H. Ferguson—Victoria Mines,	"
Isaac Greenwall	"
S. F. Lee—Little Glace Bay,	"
Bart. Connors—Victoria Mines,	"
Edw. McPhee—	"
Archie Ferguson—	"
G. H. Greenwall—Sydney Mines,	"
Hector McKinnon—Stellarton,	"
A. D. McKenzie—Vale Colliery,	"
Henry McCarter—Stellarton, Pictou Co.	
Alex. McDonald—	"
Thos. Blackwood—Westville,	"
Wm. Lormier—Chignecto Mines, Cumberland Co.	
Chris. Hargreaves—Springhill,	"

The following received certificates as overmen :—

R. B. Crosby—Cow Bay, Cape Breton Co.	
Murdock Morrison—Cow Bay, Cape Breton Co.	
Chas. Young—Sydney Mines,	"
Edw. Lockman—	"
M. Sullivan—	"
Dan. Brown—	"
Jno. Dorsay—	"
Thos. Johnstone—Bridgeport,	"
Jno. Caddigan—	"
Alex. Cameron—	"
Donald Ferguson—Victoria Mines,	"
Alex. McAskill—	"
W. H. Nicholson—Stellarton, Pictou Co.	
A. Babine—Chignecto Colliery, Cumberland Co.	
Chas. Rennie—Springhill,	"
Arch. Ferguson—	"
Wm. Matthews—	"
Geo. Yarrow—	"
A. B. Welson—	"

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Pursuant to an order in Council passed Nov. 1st, 1889, the following instructors have been appointed and are now engaged with their classes :—

*Cumberland Co.*

William Wilson . . . . . Springhill.

*Pictou Co.*

James Maxwell . . . . . Westville.

Thos. Blackwood (assistant).

J. G. Rutherford . . . . . Stellarton.

\*A. D. McKenzie . . . . . Vale Colliery.

*Cape Breton Co.*

John Cleary . . . . . Sydney Mines.

John Wier . . . . . Victoria Mines.

Hugh Campbell . . . . . Old Bridgeport.

John Johnston . . . . . International Mines.

S. F. Lee . . . . . Little Glace Bay Mines.

R. D. Anderson . . . . . Cow Bay.

In a similar manner it is proposed to change the schools from locality to locality as the number of pupils permits in order that in rotation all districts may have the benefit of the instructor's work. The expenditure under this head last year was \$2647.14, which should not be exceeded again, as considerable expense was incurred in fitting out the instructors with instruments.

The following are the questions asked at the Examination of last season :—

I. MINES REGULATION ACT.

1. State what you know of the Act in regard to the prohibition of single shafts, and state under what conditions they are allowed, and by whose authority ?

2 State what notices have to be sent to the department of Mines, detailing each under its proper heading ?

3 State to what extent the Inspection of a mine can be carried, and by whom ; and in case of a fatal accident, what power has the Inspector ?

4 State the requirements of the Act as to ventilation, inspection of working places, and give the time during which inspection must be made ?

5 State under what conditions workmen must be withdrawn from a mine ?

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\* Since died. H. McCarter appointed in his place.



6 State under what conditions, and when it is necessary, that safety lamps should be used ?

7 State fully under what conditions gunpowder may be used, both before and after inflammable gas has been discovered in a mine ?

8 State what the Act requires of places being driven towards an accumulation of water ?

9 State the requirements of the Act as to the securing of roofs and sides.

## 2. VENTILATION.

1. What is fire damp, where is it met with in coal mines, what are its dangers, and how is it rendered harmless ? What is choke-damp, where found, what are its effects on human life, and what is its relative weight to atmospheric air ?

2 Under what circumstances can furnace ventilation be recommended, and when would you prefer a fan ?

3 Describe the different methods of measuring air, and at what velocities will safety lamps of ordinary make become unsafe ?

4 State what sized air-way you consider proper for a non-gaseous mine in which 200 men are employed, assuming the length of the air-way at one mile ? Give your reasons for the size you name.

5 What is meant by Brattice ? describe its construction ; and if using it, state on which side you would have your intake, supposing a place 9 feet wide, and the Brattice to be 3 feet from the rib ?

6. If you found in a mine under your charge a large body of fire damp, how would you proceed to remove it, and what precaution would you take in so doing ?

7. Describe a regulator, an air-crossing, and 'splitting the air,' and of what value are they in coal mines ?

8. If you had 50,000 cubic feet per minute, and wished to increase it to 80,000, how much would you have to increase your power ?

9. In driving your levels away from the pit bottom, and you met with a good deal of gas, and not having either furnace or fan, what would you do to help you out until one or the other were ready ?

10. If you have 25,000 feet of air passing with a water gauge of 1 inch, what would pass with a water gauge showing  $2\frac{1}{2}$  inches.

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### 3. MODES OF WORKING COAL.

1. Describe fully how you would sink a shaft for the first 50 feet through sandy soil, with reference to timbering, pumps, and surface arrangements ?
2. What size of pillars would you have at depths of 200, 500, and 1000 feet, and what width would you make your boards ? Give your reasons.
3. What do you know about underground haulage, especially along levels ?
4. Under what circumstances would you be prepared to advise robbing pillars in flat and pitching seams ?
5. In driving levels in a flat seam, you meet with a down throw fault of 18 feet, how would you proceed to regain the coal ?
6. On reaching the coal in a shaft 600 feet deep, what size would you make your shaft pillars, width of levels ? and state how far you would drive your narrow work before you laid off any rooms.
7. If your roof was soft and shelly, give a free hand sketch of how you would timber it.
8. If you had a slope 2,000 feet long, dipping 8 inches to the yard and had a gross weight of tubs and coal = 10 tons, what size and quality of rope would you use ?
9. Give a free hand sketch of a section of a pit working board and pillars, giving size of openings and pillars under a cover of 400 feet.

NOTE.—All the above questions for Underground Manager's paper. Any six may be selected for Overman's paper.

### 4. SURVEYING.

1. Write out in the form of a field book, the following survey :—

Start at A, thence N  $35^{\circ}$  E, at 1 chain head 6 lks to left, at 2 chains 70 lks. reach Station B, head 7 lks to left; thence N  $83^{\circ} 30'$  E 1 chain 29 lks. to Station C; thence S  $57^{\circ}$  E at 50 lks head 6 lks. to right and 6 lks to left, at 1 chain 50 lks. head of slant 5 lks to left, at 2 chains 22 lks. Station D; thence S  $34^{\circ} 15'$  W, at 3 chains fault running North and South at 3 chains 55 lks. Station E.



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2. Plot the following:—

N  $35^{\circ}$  E 270 feet, thence  
N  $83\frac{1}{2}^{\circ}$  E 129 feet, thence  
S  $57^{\circ}$  E 222 feet, thence  
S  $34\frac{1}{4}^{\circ}$  W 355 feet, thence  
N  $56\frac{1}{2}^{\circ}$  W 323 feet.

3. How would you ascertain the position of any part of a mine in vertical relation to objects on the surface, the seam being inclined at an angle of  $15^{\circ}$ ?

4. What precautions would you take in checking a survey made many years ago by the magnetic compass?

5. How would you test a magnetic compass to see if it was accurate?

#### 5. GENERAL SCHOLARSHIP.

1. Multiply .3145 by .07854.

2. A place 5 feet by 7 feet is paid \$4.60 per running yard, what would it cost per cubic yard?

3. An anemometer gives a speed of 320 feet in 36 seconds in a place 9 feet by 6 feet, what quantity of air passes in a minute?

4. A steam pipe of  $3\frac{1}{2}$  inches diameter has to be replaced by one of double the area. What would be the diameter of the new pipe?

5. A water pipe 12 inches in diameter, has 96 feet of water standing in it, what is the weight on a square inch at the bottom? a cubic foot of water weighing 62.5 lbs.

6. A man mines 3 cubic yards a day in a level 5 feet by 12 feet; how long will it take him to drive a distance of 15 feet?

7. Three men worked in a place that is paid \$113; A worked 26 days; B worked 18 days; C worked  $23\frac{1}{2}$  days; how much comes to each?

8. A duplex pump having plungers  $5\frac{1}{2}$  inches in diameter with 18 inch stroke, makes 40 single strokes per minute. How many gallons does it discharge in a minute?

## GOLD.

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The total returns for this year show that 39,160 tons of quartz were crushed, yielding 26,155 ounces of gold for 211,548 days' labor, compared with 22,407 ounces of gold from 36,178 tons of quartz for 163,772 days' labor. These results are encouraging as showing an increase over last year's work, and as being the largest returns since the first year 1862, except the year 1867 when the yield was 27,314 ounces from 31,386 tons for 218,894 days' labor.

From the results of the year's work it is anticipated that the year 1890 will see a still further improvement.

The total receipts from gold were:

Prospecting licenses. ....	\$15,358.08
Rents (Leases.).....	6,055.00
Royalty .....	9,959.25
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	\$31,372.33

The following statement shows these results by counties:

### PROSPECTING LICENSES.

Queens .....	\$4,596.49
Halifax .....	4,443.97
Hants .....	2,389.42
Lunenburg .....	2,267.41
Guysboro .....	662.01
Yarmouth .....	457.89
Other counties ...	537.89
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Total .....	\$15,358.08

### RENTS (LEASES.)

Halifax .....	\$18,14.50
Queens .....	1,388.00
Lunenburg .....	1,176.00
Hants .....	1,035.50
Guysboro .....	450.50
Yarmouth .....	66.50
Other counties .....	124 00
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Total .....	\$6,055.00

## GOLD ROYALTY.

Halifax .....	\$4,066.37
Queens .....	3,072.10
Hants .....	1,734.77
Guysboro .....	909.73
Yarmouth .....	94.99
Lunenburg .....	81.39
Other counties .....	

Total.....\$9,959 35

## SURVEYS—GOLD.

During the past season a large number of surveys have been made for the Department of leased areas. At Montague several surveys were made by Mr. F. W. Christie, and stone monuments placed at the common corner of areas 1048, 1047, 1152 and 1153, the north-west corner of the "Lawson" property, at the common corner of areas 1447, 1448, 1552 and 1553, and at the common corner of areas 1434, 1435, 1565 and 1566. The latter is on a corner common to the "British American" and "Sutherland" properties. He was also employed to lay off in the beginning of the year the Ardoise district where ground had been taken up over a long stretch of country.

In connection with a dispute in the Eastern part of the Leipsigate gold district, known as the Fralic dispute, Mr. Christie and Mr. J. W. Wentzell were employed to locate the Prospecting License which had been applied for by metes and bounds in its true relation to the lines of the district as already settled. In May Mr. Christie was sent to Tangier in pursuance of a recommendation of the Committee of Mines and Minerals to ascertain the extent of an alleged irregularity in the office plans. He reported that originally the distinct blocks of ground applied for had been projected and connected on the office plan without a preliminary connecting survey. He was also employed in making surveys at Rawdon, and assisted in Inspection work, and in collecting information for this report.

Mr. J. W. Wentzell of Bridgewater made surveys of areas at Liverpool Road, Blockhouse, Gold River, Pleasant River, Rudolph's Brook, and Vogler's Cove.

Mr. S. Smith was engaged in Queens County in making surveys at Whiteburn, Westfield, West Caledonia, Brookfield, and Malaga.

Mr. C. W. Pye of Sherbrooke made surveys for the Department at Ecum Secum, Redhead, Doliver's Mountain, Quoddy, and Lochaber.

Mr. J. F. Anderson and Mr. J. McKenzie also did some survey work for the Department.

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## HALIFAX COUNTY.

This county has within its boundaries a large number of mines and many of the older districts. The improvement in the output of these mines, the success attending efforts to recover old workings, the good ore found in the old mines, and the improvement in the methods of mining, are subjects for congratulation to the gold-mining industry. Although foreign capital has not been attracted in any great extent to these mines, there has been a very encouraging advance in values, and an increase in the confidence with which the properties are regarded by their owners and operators. The expected increase in the output for the coming year is justified by the present condition of the mines and the extent of working ground open.

*Montague.*—This district is again enjoying a period of prosperity. The year's work and the outlook of the mines are very satisfactory. The Annand mine has yielded large returns and some remarkably rich ore. This mine has now a large extent of workings open, and an extensive mining plant. The Rose mine was re-opened, and a large body of rich ore found. Some work was done by tributors on the Kaye-Symonds property. Some tribute work was done on the Montreal property, and a large amount of prospecting throughout the district. The returns show a maximum yield of  $26\frac{1}{2}$  ounces to the ton, and an average of nearly 2 ounces.

*Caribou.*—This district has improved. The "Lake lode" property has produced regularly, and has had plenty of ore. At the Caffrey mine, exploration work has been the bulk of what was done. On the Heatherington property a lead was opened by putting down several pits, a number of mine buildings put up, and the construction of a crusher commenced—to be finished next season. On the Dixon areas underground work has been vigorously pushed; a very promising lead developed, and a new crusher built on the property. During the coming year there will be four crushers available for work. With the present facilities, a great advance should be made during 1890, and a large output returned.

*Waverley.*—A large amount of development work has been conducted by Mr. Hayward on ground on the American Hill district, and several thousand of tons of milling ore have been blocked out. A search has been continued in East Waverley for the barrel quartz. Mr. Wilson worked on the West side of Muddy Pond, and some work was done on the Palgrave areas. On the starting of the new mill, a steady return may be counted on for some time.

*Lake Catcha District.*—The Oxford Co. have confined most of their operations during the past year to prospecting. They drained Lake Catcha and discovered several leads in its bed, and have commenced developing one. The swamp in the centre of the property was also drained, and a prospect trench of about three hundred feet shows

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the existence of over fifty leads aggregating thirteen feet of ore, all of which is gold-bearing. On one of these leads work has been progressing for the past three months.

A roll was discovered on the Coleman lead near the east end of property, which promises well. The Company have discovered over one hundred leads on their property, and find indications of several more.

The total returns to date show a yield of thirteen thousand three hundred and sixty-three ozs. from 9,728 tons ore.

Jno. H. Anderson has done considerable prospecting on his western areas, and discovered several leads showing gold, on one of which he has commenced development.

Some work was also done on the Cambridge and Cogswell areas.

*Fifteen Mile Stream.*—The returns show 3,634 days' labor, 1,416 tons of quartz crushed, and 786 ounces of gold. The Egerton Company has worked steadily, and at the close of the year arrangements were made for its transfer to a larger Company, to be under the superintendence of one of our most experienced gold-mining engineers.

*Moose River.*—This district has returned about the same amount as it has for several years past. The yield has been fairly steady, without much fluctuation. Mr. McGregor is working one portion of the Moose River Gold Mining Company's property, and Wm. Bruce another. Mr. Touquay has worked regularly on his property, — a special feature of his work being the working of large quantities of alluvium by the crusher.

*Salmon River.*—Pending transfers of interests of the Dufferin Company, the work on the property has not been energetically pushed. The appearance of the mine and ore is satisfactory, and an extension of the work during the coming year is anticipated. The mining plant continues to give satisfaction, and the size of the village about the works is increasing. The returns show 2032 ounces from 7633 tons of quartz, the total returns to date being 33200 ounces from 73,041 tons of quartz.

*Tangier.*—This district has made no progress during the last year. Work to a limited extent was regularly carried on at Strawberry Hill. John Murphy and others worked in different places in old Tangier. Prospecting was carried on to some extent at Mooseland.

*Beaver Dam.*—A large amount of prospecting has been carried on here with gratifying success. A number of leads showing well have been opened up, and the erection of a large crusher will be commenced during the ensuing year.

*Lochaber.*—Work in this district has been limited to development, exploration and testing. The Lochaber gold mining company have a steam mill and hoisting works.

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*Harrigan Cove*.—This district has now a good steam mill, but the past year's work has been confined to prospecting. The McMann property and crusher have been bonded to purchasers, and a resumption of work is looked for soon.

*Ecum Secum*.—Some mining was prosecuted with fair results at this place, and a good deal of prospecting.

*Lawrencetown*.—The discovery of a rich lead was reported from Lawrencetown during the summer, and considerable prospecting was carried on.

*Killag*.—In fall of 1888 the result of the prospecting, which had been carried on for several years, was to fix the position of the vein yielding so much rich drift under a large swamp. During the past season hoisting plant, pumps, etc., were prepared and a shaft pushed down through 25 feet of quicksand, and sunk 35 feet in the solid, a cross cut driven 60 feet, and the long sought-for vein proved. The vein is 10 inches wide, and bedded in talcose slate. Some tons of ore, estimated to be good for 2½ ozs. per ton, were taken out. A crusher has been put up, and other necessary buildings, etc., and it is anticipated that next season good returns will be realized.

## QUEENS COUNTY.

Mining work has been very brisk in this section, with a large amount of building and development work going on. The yield of gold has been satisfactory, and a large output is expected in the season of 1890. A number of new mines have been opened, and several new crushers will be started in the coming season. Roads to the different mines have been built or repaired, telephone facilities increased, and means of travel and freighting extended by the establishing of steam ferries in the lakes near Malaga Mines, and stage lines to the different mines, and to points on the Nova Scotia Central Railway. The gold mines in the county are attracting the attention of foreign mining investors, and business of all kinds was greatly stimulated by the hopeful and encouraging tone of the gold mining industry. Prospectors and explorers were very busy searching for new places.

*Malaga Barrens*.—The returns show 3976 ounces from 4388 tons of quartz, an average of 18 cwts.

This district is the most important in the country, and has made rapid progress. An agent of the Department of Mines examined the district in the summer of 1886, the year of the discovery of gold in the place. There were then no persons permanently residing in the locality, and no habitation but a tent. The population of the Mines is now estimated at 500. A school house has been built, stages run daily to Bridgewater and Caledonia, and in the summer there

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are two small steamers making daily trips to the Mines. There are now four crushers in the district with a total of 65 stamps, and another mill will likely be built in 1890. The Malaga Mining Co. are operating four mines principally by contract, and a twenty-stamp crusher. The Minneapolis crusher has not been running this year on account of litigation about the affairs of the company. The Parker-Douglas Co. have been pushing work during the season, added to the number of their stamps, and remodelled their hoisting works. They are using air drills in their pits. The Caledonia Co. in the eastern part of the district, have done a large amount of development work in opening up several veins, and finished a very complete mill, combining crusher and hoisting works. The Boston Mining Co. have purchased a large tract of areas, and have been fortunate in finding very promising ore in several veins on their property. They expect to put up a crusher and hoisting works during the coming season. The outlook for the business of the district for 1890 is very encouraging and a large output is expected.

*Brookfield.*—The returns show 1796 ounces from 1472 tons; an average of 1 oz. 4 cwts. The principal work in the district has been carried on by the Philadelphia Co. who are now operating two mines, one on the Dunbrack Lead and one on the Nelson Lead. The Philadelphia Co. had been using the mill of the Brookfield Mining Co., but during the year finished a very complete mill on their own property conveniently situated to handle the ores from the two mines. Although these mines have necessarily been largely employed in development work the output has been very satisfactory, and now that they have such a complete plant next season's returns are expected to be large. It is to be regretted that the Brookfield Company's works are closed, but it is to be hoped they will resume work next season. A large number of areas are held in this district, but prospecting work is only done by spells, and if a more determined effort is not made to develop the areas the district must necessarily have but few working mines.

*Whiteburn.*—This district has continued to be a fairly steady producer, although the yield has decreased a little. McGuire & Co. were working two veins, but closed down at the end of the season. It is expected that the mine will be furnished with new and more extensive plant, and resume work in the coming summer. The Whiteburn Mining Company worked on several veins and did a very fair business, and handled a good quantity of ore in the mill. Some prospecting was carried on, but the expectation of the opening of mines in the southern portion of the district was not realized.

The returns show 2440 ounces from 1639 tons of quartz.

*Other places.*—Prospecting was carried on at West Caledonia, Fifteen Mile Brook, Greenfield and at some other points where gold has been discovered, but although some rich boulder drift was found at West Caledonia, and Fifteen Mile Brook no mines have been opened.



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### GUYSBORO.

Mining business in this County is improving, and the outlook is encouraging.

*Goldenville.*—This district is reviving, and the work of the past year has been profitable. The owners of some of the old properties contemplate re-opening the workings, most of which in the past yielded very profitable returns. John H. McDonald has been working low grade ore with so much success that he expects to work a much larger amount during 1890. Mr. Williams and associates have re-fitted the mill and hoisting gear on the property adjoining the Palmerston, and intend to put out a large amount of the low grade ore on the areas. Robert McNaughton has met with very encouraging success in developing a property at the eastern end of the district, and has put up a number of buildings. There has been the usual tributing in the district during the season, and a large amount of tailings has been re-worked. A good return may be expected from the work of 1890.

*Cochrane Hill* workings have been again closed down. At "Crow's Nest" a company are at work developing the Fraser areas. A tunnel was started into at the foot of the hill on the Fraser lead, with the intention of driving on the course of the lead until the main shaft was reached, and thus open up a large amount of stoping ground. A cross-tunnel was driven from the main tunnel to cut several veins lying to the northward of the Fraser lead. A large quantity of ore for stoping will thus be "blocked-out" in the most advantageous position for easy working.

*Wine Harbour.*—The most important work in this district has been on the Middle lead. The old Eldorado mill was dismantled and a new mill put up to crush the Middle lead ore. Malcolm Cameron and others have worked a number of tributes throughout the district. The great scarcity of fuel in the locality has greatly hindered mining work. Parties prospecting in the district have met with fairly good success.

*Stormont.*—The principal work in this district has been at the Island mine at Isaac's Harbour. This mine has worked steadily, and yielded large returns. H. K. Fisher put machinery on the North Star property, on the west side of the harbour, in December, for the purpose of reopening the pits. There has been but little tribute work in the district. At Country Harbour Narrows some work was done on the Johnson's Brook properties, and it is claimed that a large belt of valuable low grade ore was defined. A discovery of rich ore was reported as found at the Narrows.

### LUNENBURG COUNTY.

There are no special features to be noticed in the gold mining operations in this county. Work has been nearly confined to Gold



River, Millipsiget, and Pleasant River. The old districts of Indian Path and the Ovens are still idle.

*Gold River.*—This district has not been a large producer, but development work has been very largely carried on, especially at the Neptune Mines. A complete system of shafts and tunnels is in process of development at the Neptune Mines, and a large quantity of ore, estimated to be of good value, has been "blocked out." Some rich outcrops of ore on the Neptune Mines and other properties have been struck, and the proprietors are very confident of doing a well-paying business in the future. There are two mills in the district, with a total of 30 stamps.

*Millipsigate.*—The Owen property at the "Bluff," and the mill, were operated for a time. A pit was put down to intersect the vein from the Bluff. Considerable prospecting was done all over the district, and some very good ore was found and some veins sunk on to a limited extent. There are a large number of veins known in the district that look well and warrant attention. The district is conveniently situated and the rock usually mines easily.

*Pleasant River Barrens.*—In this district considerable work has been done, although, for want of a mill, no gold has been produced. Messrs. Thompson and Newcombe have built a large and complete mill near the site of the mill that was burnt down. They have fitted up to work the old mine, and have opened a mine on a lead to the westward of the mill. They have a pile of good-looking ore, and feel confident of doing a prosperous business.

## HANTS COUNTY.

Work has been carried on at Central Rawdon, Old Uniacke, South Uniacke and Renfrew, regularly during the season, and the returns have been very profitable.

*Central Rawdon.*—This district has given remarkable returns of gold. The character of the veins and the geology of the locality differ from those of the general class of mining districts throughout the Province. The rock works with remarkable ease, and mining is very cheap in the district. The first Gould-Northup property was bought by a company of Philadelphia capitalists, and more extensive workings were planned. The plant has been increased by a superior steam hoist and new boilers set up to work the mine and mill. Northup and his associates have opened up a property to the eastward of the old property and built a new crns her. This is a thriving district and is expected to yield largely during 1890.

The returns showed 2358 ounces from 925 tons of quartz.

*South Uniacke.*—Work on the "Withrow" areas has been carried on very energetically, there being now two mines working on the property. The eastern mine has produced steadily except when work

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was confined to sinking the pits and "blocking out" stoping ground. A steam plant was put up on the "hulk" lead near the mill. Jas. Thompson and associates continue working the property lying east of the "Withrow," and erected a mill for crushing and steam hoisting gear to handle the ore. This district is expected to yield good returns during the coming year.

*Renfrew.*—At the Empress mine work has been carried on steadily. The cross-cuts to the Hay and Preeper leads were completed and a large body of ore was reached, the mine at the level of the cross-cuts being about 370 feet deep. The new water-mill on the stream was completed, and has been in operation a large portion of the season. This mill is supplied with improved batteries and feeders, and is claimed to have nearly double the capacity per stamp over the mills formerly built in this Province. The "Free Claim" property has been energetically and profitably worked this season. The crusher was put in repair, and a new water-wheel set up. Hoisting gear, operated by power from the water-wheel, was set up at the pits, and the property is operated entirely by water-power. The opening of other properties is under consideration by the owners.

*East Rawdon.*—It is to be regretted that these formerly productive properties have not been refitted since the fire that destroyed so many buildings and so much plant. The properties have been in the hands of an expert who has been testing the ore, examining the mines, and prospecting for new leads. There is a reasonable hope that these properties will be fitted up during the coming season.

*Mount Uniacke.*—Work in this district has been mostly confined to tribute work, and the re-opening and re-fitting of old pits. Messrs. Prince & Co. have been sinking on old ground, and have had good success in finding paying ore, and have made some encouraging returns. They are expecting to work on the basis of low grade ore. This district is expected to be a good producer during the coming season.

#### YARMOUTH COUNTY.

Mining has been dull in this county. Some work has been done at Kemptville, but the loss of the mill on the Kempt's property had caused serious delay. Some prospecting had been done at Chegoggin Point where a company are now putting up a large plant to work low grade ores on an extensive scale.

## IRON MINING.

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At Londonderry the returns show 40,823 tons of ore mined. A man was killed at this mine during the past season by moving from a cage in motion. The management have since taken additional precautions to make all shafts more secure for men riding in them. Mr. R. G. Leckie, formerly Managing Director of the Cumberland R. R. and Coal Co., has taken charge of these mines in place of Mr. Sutcliffe.

On the East River of Pictou two companies have commenced preparations for mining and smelting iron ore, viz., The Nova Scotia Midland Railway Company, and the New Glasgow Coal, Iron and Railway Company. The latter have turned their attention to the Limonite ores between Springville and Sunny Bræ, and Mr. R. E. Chambers has developed some fine bodies of ore. About 3,000 tons of ore have been taken out during the progress of his work. One point tested on the D. McDonald property showed 25 feet of ore of excellent quality. The Midland Company did some work on the Specular areas belonging to Mr. Holmes. At Newton Mills, Stewiacke, the large bed of red hematite was tested by Mr. Chambers, and about 400 tons of ore taken out.

At Brookfield, Colchester, about 1700 tons were extracted for use at Londonderry. The vein was found too narrow going East, but going West it was proved to have a thickness of at least 30 feet.

In the fall arrangements were made with a view to opening the Torbrook ores, in Annapolis county for use at Londonderry.

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## MANGANESE.

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The returns show a falling off in the production of this mineral. Mr. John Stephens, of the Tenny Cape Mine, Hants County, returns a production of 81 tons of No. 1 ore, of which 36 tons (valued at \$2178) were shipped. An average of 5 men and 2 boys were employed.

Mr. Moseley, of Sydney, sold 31 tons from his Loch Lomond mine, guaranteed 90 per cent., and some highly crystallised. An analysis of the ore from this mine yielded the chemist of the Geological Survey—

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Available per oxide manganese.....	91.84
Per oxide of iron .....	.12
Insoluble residue .....	2.11

I am not aware of any fresh discoveries of this ore of importance.

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## BARYTES.

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The mines working during the year 1888 were not opened during the past season.

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## LEAD.

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There is nothing new to report under this head. Some prospecting was done to the west of the Smithfield mines, in Colchester County and the owners of the Smithfield mine have taken out a lead ore lease.

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## COPPER.

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No work of note has been done this year, the failure of the French Copper Syndicate having upset all basis of price, etc. At the Coxheath Mines the Eastern Development Company have, since the opening of their mine on what may be considered a working basis, turned their attention to preparations for building a railway and smelters. The County of Cape Breton has released them from taxation on all real and personal property for 25 years. At the mine a carpenter's shop, dynamite magazine and dry house have been put up. Below ground the shaft has been deepened about 50 feet, and more cross-cuts driven, which have proved the continuation in depth and quality of the valuable veins referred to in my last report. The ore extracted in the underground levels has been dressed, and the amount of ore now in stock is about 2000 tons.

During the summer explorations have shown a valuable vein about 1500 feet south of the present workings. This vein is about 10 feet wide and runs 17 per cent. of copper, and holds per ton 5 dwts gold, and  $\frac{1}{2}$  ounce of silver. This discovery has added greatly to the resources of the company.

The returns show average number of men employed.

	No.	Day's Work.
Under ground Skilled Labor .....	12	} 6956
Laborers .....	11	
Above ground Skilled Labor .....	12	} 4872
Laborers .....	4	
Teamsters and Coalhaulers .....	—	

I remain, yours, obediently,

E. GILPIN, JR.,

*Inspector of Mines.*

MINES REPORT.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area Square Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, McKay et al.....	.....	1
	CAPE BRETON COUNTY.		
105	Burchell, J. E.....	.....	1
106	} Eastern Development Co. { .....	.....	1
95		.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
	Greener, John.....	.....	1
	HALIFAX COUNTY.		
1	McClure, Chas. F. ....	Gay's River .....	1
	COLCHESTER COUNTY.		
	Clarke, Howard .....	Smithfield .....	1

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

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MINES REPORT.

No.	Lessee.	District.	Area Square Miles.
IRON.			
PICTOU COUNTY.			
44	Hudson, James.....	East River.....	1
43	" .....	" .....	1
	Cameron, N .....	" .....	1
60	New Glasgow C. I. & R. Co.....	" .....	1
47, 48, 49, 50, 51	Bartlett, J. H.....	" .....	5
52, 53, 54	Townsend, W .....	" .....	3
55, 56, 57, 58, 59	Ferguson, J. H.....	" .....	5
CAPE BRETON CO.			
86	Brookman, S. et al. ..	N. Side East Bay.....	1
91	Brookman, S. L.....	East Bay .....	1
93	Brookman, S. et al. ....	" ..	1
102	C. L. Ingraham .....	" ..	1
103	A. McKenzie et al.....	" ..	1
92	Matheson, D. et al.....	" ..	1
84	Protheroe, Pryse .....	Cow Bay .....	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co. ....	Whycocomagh .....	1

Total area under lease.....34 square miles.

# MINES REPORT.

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## LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
21	Bligh, James, et al.	CUMBERLAND CO.	1			
47	Boston C. M. Co.		1		John Moffatt	River Hebert.
54	Cumberland C. M. Co.	Chignecto	4	Working.	Jas. Baird	Maccan.
12						
6, 7, 8, 44, 52, 55	Cumberland R'y & Coal Co.	Springhill	9	Working.	J. R. Cowans	Springhill.
17						
	Joggins C. M. Association	Joggins	2	Working.	P. W. McNaughton	Joggins.
	Joggins C. M. Co.		2			
5	Lawson C. M. Co.	Maccan	1			
51, 53	Milner, Christopher		2			
1, 2, 3, 4	New York & Acadia Co.	Scotia	4			Maccan.
56	W. Patrick et al.	Patrick	1		W. Patrick	Maccan.
57	Salt Springs Coal Co.		1		J. L. Hewson	Oxford.
16	Minudie M. & T. Co.		1	Working.		River Hebert.
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.)		5		J. S. Hickman	Amherst.
9	Victoria Coal Mining Co.		2			
	McNaughton P. W.		1			
58, 59, 60, 61	Cumberland R. R. & C. Co.		4			
	Cowans & Cove.		1			
	Annand, Chas.		4			
			1			

Area under lease.....47 square miles.



LIST OF COAL LEASES.—(Continued.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	Acadia Coal Co . . . . .	PICTOU CO. Fraser . . . . . Acadia . . . . . Pictou . . . . . Vale . . . . . Albion . . . . .	1	Working.	{ H. S. Poole. . . J. Macveall . . . T. Turnbull . . . J. Dunbar . . .	Stellarton. Westville. Vale Colliery. Albion Colliery.
3	" . . . . .		1	. . . . .		
42	" . . . . .		4	Working.		
23	" . . . . .		3	Working.		
	" . . . . .		4	Working.		
10	Gray, B. G., et al. . . . .	. Drummond . . . . .	1		C. Fergie . . . . .	Westville.
11	Haliburton, R. G., et al. . . . .		1			
13, 14,	Intercolonial Coal Co. . . . .		2			
12	" . . . . .		1	Working.		
6	Montreal & New Glasgow . . . . .		1			
24	Richey, M. H. . . . .	. . . . . . . . . . East River . . . . . . . . . . . . . . .	1		Muir & Sons . . . . .	New Glasgow.
45	B. G. Gray . . . . .		2	Working.		
46	N. Glasgow I. C. & R. R. Co. . . . .		1			
	Acadia Coal Co . . . . .		1			
			<hr/> 24 <hr/>			
		CAPE BRETON CO.				
3	Archibald, Blowers. . . . .	Gowrie . . . . .	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney. Cow Bay.
2	Archibald, Thomas D. . . . .	" . . . . .	1			
5, 28,	C. Belloni. . . . .	Blockhouse . . . . .	2	Working.	R. Belloni . . . . .	Cow Bay.
29	" (sea area). . . . .	" . . . . .	1			

MINES REPORT.

15	Caledonia C. & R. Co. ....	Caledonia ....	1	Working.	David McKeen ..	Glace Bay.
31	" (sea area)...	.....	1			
8, 9	Halifax Coal and Iron Co..	Ontario .....	1½	Working.	Jno. Sutherland .	Pt. Caledonia.
	General Mining Association.	Bridgeport.....	2		{ Rich. H. Brown.	Sydney Mines.
	" " ..	Sydney .....	18	Working.	{ Cunard & Morr'w	Halifax.
27	" " (sea area)...	" .....	4		{ H. Mitchell....	Bridgeport.
	Low Point, Barasois, and...	Lingan. ....	13	Working.	R. Robson .....	Low Point.
38, 39	Lingan Mining Co., (Ltd.)..	" .....	10			
10, 21	Gibson, John, et al.....	.....	2			
4, 12, 16	Glace Bay Mining Co. ....	Glace Bay ....	3	Working.	{ E. P. Archbold..	Halifax.
6, 13, 18, 19, 30	Internat'nal Coal Co., (Ltd.)	International ..	5	Working.	{ Chas. Rigby.....	Lt. Glace Bay.
66	Merchants' Bank of Canada.	Gardner .....	2		J. G. S. Hudson..	Bridgeport.
52, 53	McLeod, Hugh .....	.....	2			
40, 41, 42	Ross, H. E., et al. ....	.....	3			
79	Ross, W. J., et al. (sea area).	.....	1			
32	Weatherbe & Hendry, " ..	.....	3			
23, 25, 70	Sydney & Louisburg Coal &	.....				
14, 24	R. R. Co., (Ltd.) .....	Schooner Pond ..	} 10			
49	" " " ..	Reserve .....		Working.	D. J. Kennelly. ..	Sydney.
64, 65, 68	" " " ..	Lorway .....				
69	" " " ..	Emery .....				
54 to 63	Sydney C. M. Co. (sea areas)	.....	10			
67	Weatherbe & Kirby .....	.....	1			
78	Weatherbe, R. L. (sea area).	.....	5			
96, 97, 98, 99, 100	Low Point, Barasois and	.....	5			
	Lingan Mining Co., (Ltd.)	.....	2			
	" (sea areas)	.....	1			
	Roberts, Frank .....	.....	1			

LIST OF COAL LEASES.—Continued.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
112, 113, 114 108, 109, 110	Hamilton, A. G. et al..... Cowans & Drummond ..... Ross, W. and McLean, Jno.	..... ..... .....	1 5 3 <hr/> 119½			
7, 12 13 4 11 6 10	Inverness C. I. & R. C..... McGregor, J. D..... Richey, M. H., et al..... Ross, W. J..... Ross, H. E., et al, (sea area). Tremaine, E. D., (sea area).	..... Port Hood .... ..... Broad Cove... ..... .....	2 3 1 1 1 1 <hr/> 9			
2 3, 4, 5	Kenny, T. E. .... Ross, Wm. ....	VICTORIA CO. N'w Campbell't'n Black Rock....	3 5 <hr/> 8			
	Terminal City Co.....	RICHMOND CO. Caribou Cove..	1			
Total area under lease.....			242½	square miles.		

TABLE A.--COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPR BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter . . . . .	108,986	97,656	100,679	74,853	103,466	8,857	.....	.....	313,131	181,366
2nd Quarter . . . . .	110,464	92,656	88,779	79,083	230,225	202,947	.....	.....	429,468	374,686
3rd Quarter . . . . .	119,213	100,970	123,039	113,875	315,581	356,591	.....	.....	557,833	571,436
4th Quarter . . . . .	151,778	128,346	118,883	115,671	185,186	183,602	.....	.....	455,847	427,619
Total . . . . .	490,441	419,628	431,380	383,482	834,458	751,997	.....	.....	1,756,279	1,555,107
1888 . . . . .	470,829	419,549	474,188	418,893	831,111	738,250	.....	.....	1,776,128	1,576,692
1887 . . . . .	499,472	465,148	389,906	339,034	786,360	715,442	100	60	1,670,838	1,519,684

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land													
Sales ....	58,159	37,885	5,253	119,229	86,994	...	2,203	4,558	...	179,591	129,437	5,253	314,281
Sea Borne.....	997	241	...	34,024	7,461	...	157,666	23,312	12,443	192,687	31,014	12,443	236,144
Total.....	59,156	38,126	5,253	153,253	94,455	...	159,869	27,870	12,443	372,278	160,451	17,696	550,425
New Brunswick.	88,261	22,871	18,364	28,825	3,587	..	32,570	520	176	149,656	26,978	18,540	195,174
Newfoundland ..	.....	...	.....	147	6	..	84,466	2,924	...	84,613	2,930	.....	87,543
P. E. Island ...	.....	...	.....	7,460	21,704	..	15,194	10,582	..	22,654	32,286	.....	54,940
Quebec .....	38,052	19,689	119,720	68,506	4,755	...	317,501	62,515	1,058	424,059	86,959	120,778	631,796
W. Indies .....	.....	...	.....	.....	.....	...	3,983	.....	...	3,983	.....	.....	3,983
United States ..	.....	9,946	190	132	652	...	5,333	13,733	...	5,465	24,331	190	29,986
Other Countries.	.....	...	.....	...	.....	...	1,260	.....	...	1,260	.....	...	1,260
Total.....	185,469	90,632	143,527	258,323	125,159	..	620,176	118,144	13,677	1,063,968	333,935	157,204	1,555,107

# MINES REPORT.

I

## COAL—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1889.	Year 1888.
Nova Scotia :						
Land Sales,	78,738	63,138	66,871	105,534	314,281	280,521
Sea Borne,	7,583	46,194	91,559	90,808	236,144	229,384
N. S.—Total,	86,321	109,332	158,430	196,342	550,425	509,905
N. Brunswick,	40,792	43,523	46,747	64,112	195,174	214,630
Newfoundl'd,	1,435	20,869	37,045	28,194	87,543	83,725
P. E. Island,	.....	17,796	20,989	16,155	54,940	56,349
Quebec,	52,643	177,892	294,172	107,089	631,796	678,321
West Indies,	.....	813	694	2,476	3,983	3,111
United States,	175	4,461	12,099	13,251	29,986	30,198
Oth'r countries	.....	.....	1,260	.....	1,260	453
Total .....	181,366	374,686	571,436	427,619	1,555,107	1,576,692
1888 .....	168,708	386,482	601,519	419,983	1,576,692	.....
1887 .....	138,814	376,174	551,643	443,053	1,519,684	.....

## COAL.—GENERAL STATEMENT.

1889.	Produce.	Sold.	Colliery Consumption.
1st Quarter . . . . .	313,131	181,366	38,797
2nd Quarter . . . . .	429,468	374,686	40,521
3rd Quarter . . . . .	557,833	571,436	35,054
4th Quarter . . . . .	455,847	427,619	43,759
Total . . . . .	1,756,279	1,555,107	158,131
1888 . . . . .	1,776,128	1,576,692	157,443
1887 . . . . .	1,670,838	1,519 684	139,777

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1889.

MINES REPORT.

COLLIERIES.	Produce.	SALES.				COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.	Total.	Engines.	Workmen.
CUMBERLAND CO.							
Chignecto .....	18,572	9,145	4,505	.....	18,650	4,327	385
Joggins .....	45,411	34,513	8,422	.....	37,985	6,512	877
Minudie .....	1,300	1,192	108	.....	1,300	.....	.....
Springhill . . . . .	425,149	140,619	82,597	143,527	366,748	23,145	5,612
PICTOU CO.							
Acadia .....	269,607	151,303	78,585	.....	229,888	29,085	10,041
Barton .....	.....	.....	.....	.....	.....	.....	.....
Black Diamond .....	84,015	22,725	9,665	.....	32,390	907	382
East River .....	1,545	1,125	.....	.....	1,125	205	70
Intercolonial .....	125,957	82,914	36,959	.....	119,873	5,570	2,099
Holmes .....	256	256	.....	.....	256	.....	.....
CAPE BRETON.							
Bridgeport .....	21,496	23,343	879	.....	24,222	182	171
Caledonia .....	114,299	76,165	26,815	.....	102,980	1,190	1,311
Franklyn .....	4,046	3,424	980	.....	4,404	.....	.....
Glace Bay .....	80,920	71,627	2,292	.....	73,919	4,902	1,478
Gowrie .....	111,700	88,572	16,873	.....	100,445	4,550	4,480
International .....	128,915	87,788	30,848	.....	118,086	3,524	1,858
Ontario .....	2,866	2,684	10	.....	2,694	98	82
Reserve .....	121,649	90,453	19,772	.....	110,225	6,381	3,325
Sydney .....	144,966	112,230	11,672	.....	123,902	14,290	8,376
Victoria.....	108,601	68,940	8,503	13,677	91,120	9,186	3,630
Total.....	1,756,279	1,068,968	388,935	157,204	1,555,107	114,004	44,127

COLLIERY CONSTRUCTION ACCOUNT, 1889.

MINES REPORT.

K

COLLIERIES.	Shafts.	Slopes.	Levels.	Machin'ry.	Colliery Buildings.	Dwell-ings.	Surface Works.	Railways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND Co.											
Blight .....	.....	\$1635 00	\$ 630 00	\$310 00	\$ 270 00	\$ .....	\$ 207 00	.....	\$ .....	.....	\$ 3052 00
Chignecto .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Joggins .....	.....	1973 00	3928 00	.....	.....	.....	.....	.....	.....	.....	5901 00
Springhill .....	.....	.....	.....	1784 00	1577 00	.....	906 00	.....	.....	.....	4267 00
Stanley .....	.....	177 00	.....	15 00	90 00	30 00	.....	.....	.....	616 00	928 00
Pictou Co.											
Acadia .....	.....	8284 00	.....	7919 00	114 00	.....	.....	.....	.....	.....	16317 00
Black Diamond .....	.....	.....	.....	2363 00	.....	.....	.....	.....	.....	962 00	3325 00
East River .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Intercolonial .....	.....	.....	.....	2011 00	54 00	.....	.....	.....	.....	.....	2065 00
CAPE BRETON Co.											
Bridgeport .....	.....	.....	.....	.....	.....	150 00	.....	.....	.....	.....	150 00
Caledonia .....	.....	.....	2000 00	.....	.....	657 00	.....	.....	.....	.....	2657 00
Franklyn .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glace Bay .....	.....	.....	.....	600 00	.....	800 00	.....	.....	.....	.....	1400 00
Gewrie .....	.....	598 00	2268 00	.....	.....	.....	.....	.....	.....	.....	2866 00
International .....	.....	319 00	173 00	.....	.....	1204 00	.....	.....	.....	.....	1696 00
Ontario .....	.....	.....	200 00	.....	20 00	.....	.....	.....	.....	.....	220 00
Reserve .....	.....	4128 00	1266 00	37 00	.....	.....	.....	.....	.....	.....	5431 00
Sydney .....	.....	.....	.....	1796 00	.....	.....	.....	.....	799 00	.....	2595 00
Victoria .....	.....	2288 00	4246 00	.....	.....	.....	.....	.....	.....	.....	6534 00
Total .....	.....	19402 00	\$14711 00	\$16835 00	\$2125 00	\$2841 00	\$1118 00	.....	\$ 799 00	\$1578 00	\$59404 00





# MINES REPORT.

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## COAL.

### NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1870	168,180	\$1 25
1851	116,274	"	1871	165,431	" "
1852	87,542	"	1872	154,092	75
1853	120,764	"	1873	264,760	"
1854	139,125	Free.	1874	138,336	"
1855	103,222	"	1875	89,746	"
1856	126,152	"	1876	71,634	"
1857	123,335	"	1877	118,216	"
1858	186,743	"	1878	88,495	"
1859	122,720	"	1879	51,641	"
1860	149,289	"	1880	123,423	"
1861	204,457	"	1881	113,728	"
1862	192,612	"	1882	99,302	"
1863	282,775	"	1883	102,755	"
1864	347,594	"	1884	64,515	"
1865	465,194	"	1885	34,483	"
1866	404,252	"	1886	66,003	"
1867	338,492	\$1 25	1887	73,892	"
1868	228,132	"	1888	30,198	"
1869	257,485	"	1889	29,986	"

NOTE—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

## MINES REPORT.

*Nova Scotia Coal Sales, from 1785 to 1889 (Inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	51,048	1847	201,650	1,533,798
1792	2,143		1848	187,643	
1793	1,928		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320		1851	153,499	
1796	5,249		1852	188,076	
1797	6,039		1853	217,416	
1798	5,949		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775	1857	294,198		
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		
1804	5,976	1860	322,593		
1805	10,130	1861	326,429		
1806	4,938	1862	395,637		
1807	5,119	1863	429,351		
1808	6,616	1864	576,935		
1809	8,919	1865	635,586	4,927,339	
1810	8,609	1866	558,520		
1811	8,516	1867	471,185		
1812	9,570	1868	453,624		
1813	9,744	1869	511,795		
1814	9,866	1870	568,277		
1815	9,336	1871	596,418		
1816	8,619	1872	785,914		
1817	9,284	1873	811,106		
1818	7,920	1874	749,127		
1819	8,692	1875	706,796	7,317,430	
1820	9,980	1876	634,207		
1821	11,388	1877	697,665		
1822	7,512	1878	693,511		
1823	27,000	1879	688,628		
1824		1880	954,659		
1825		1881	1,035,014		
1826		1882	1,250,179		
1827	12,600	1883	1,297,523		
1828	12,149	1884	1,261,650		
1829	20,967	1885	1,254,510		
1830	21,936	1886	1,373,666		
1830	27,269	1887	1,519,684	12,124,025	
1831	37,170	1888	1,576,692		
1832	50,369	1889	1,555,107		
1833	64,743	Total.....			
1834	50,813	29,510,061			
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198	839,954			

## SUMMARY.

1785 to 1790.....	14,349	1831 to 1840 .....	839,954
1791 to 1800.....	51,048	1841 to 1850 .....	1,533,798
1801 to 1810.....	70,452	1851 to 1860 .....	2,399,319
1811 to 1820.....	91,527	1861 to 1870 .....	4,927,339
1821 to 1830.....	140,820	1871 to 1880 .....	7,317,430

MINES REPORT.

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GOLD—GENERAL STATEMENT FOR THE YEAR 1889.  
Showing the number of Mines, Days' labor performed, quantities of Quartz crushed, yield of Gold, for the year 1889.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Tons of Quartz crushed.	Yield of Gold per Ton.		Maxim. Yield of Gold per Ton.		Total Yield of Gold.	
					Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Brookfield .....	1	4688	2	1472	1	4 9	1	19 13	1796	17 18
Caribou and Moose River.....	4	20819	5	7338	..	5 4	..	7 12	1906	1 10
Fifteen Mile Stream .....	1	3634	1	1416	..	11 2	..	14 6	786	9 0
Lake Catcha .....	1	10764	2	807	..	15 1	2	9 10	607	10 0
Malaga Barrens.....	2	28686	2	4388	..	18 2	1	5 13	3976	3 13
Montague .....	2	10286	3	953	1	19 21	26	11 20	1901	10 6
Oldham .....	1	8405	1	1391	1	18 22	5	11 18	2709	0 18
Rawdon .....	1	7192	2	925	2	10 23	3	18 19	2358	10 0
Renfrew .....	2	8141	2	1070	..	13 1	1	15 18	697	17 15
Salmon River.....	1	17393	1	7633	..	5 7	..	7 14	2032	14 0
Sherbrooke.....	2	5257	4	1618	..	3 0	..	2 21	243	17 17
Stormont .....	2	16319	1	2925	..	11 22	..	15 19	1745	6 0
Tangier and Mooseland.....	1	3168	2	427	..	5 6	..	15 9	112	4 12
Uniacke .....	2	13307	3	2296	..	12 2	4	15 0	1390	11 9
Whitburn .....	4	28593	2	1639	1	9 18	2	3 15	2440	15 18
Wine Harbor .....	1	2355	2	707	..	11 17	1	0 0	413	18 6
Unproclaimed, etc.....	5	22541	15	2155	..	9 14	..	19 14	1035	18 15
Total.....	33	211548	50	39160	..	17 22	..	.. ..	26155	6 13

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	BROOKFIELD.						CARIBOU AND MOOSE RIVER.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January .....	..	...	..	105	184	..	5	2406	96	683	218	4 10
February .....	..	...	..	109	215	11	5	2125	85	561	202	8 13
March .....	..	...	..	220	303	..	5	2129	85	586	219	17 15
April .....	1	710	28	176	251	..	3	1578	63	616	188	10 18
May .....	1	570	22	111	139	..	4	1636	65	677	180	5 ..
June .....	1	497	20	99	125	..	5	1680	67	657	152	17 ..
July .....	..	...	..	101	125	..	3	1430	57	508	97	2 12
August .....	..	...	..	130	131	16	3	1465	58	668	109	19 ..
September .....	..	...	..	176	159	10	4	1362	54	413	49	3 12
October .....	1	1082	43	105	74	..	5	1498	60	639	94	11 9
November .....	1	943	37	140	89	..	4	1776	71	754	174	7 5
December .....	1	886	35	...	..	..	4	1734	69	576	218	14 12
Total .....	1	4688	...	1472	1796	17 18	4	20819	...	7338	1906	1 10

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	FIFTEEN MILE STREAM.						LAKE CATCHA.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January .....	1	.....	.....	.....	..	..	1	1155	46	138	89	1
February .....	1	.....	.....	.....	..	..	1	802	32	99	44	..
March .....	2	.....	.....	96	47	..	2	1117	44	96	32	2
April .....	1	466	18	110	43	15	1	449	18	..	..	..
May .....	1	518	20	108	50	10	1	708	28	35	68	12
June .....	1	717	28	160	88	..	1	866	34	27	31	12
July .....	1	519	20	152	78	2	2	1025	41	..	..	..
August .....	1	676	27	167	77	11	2	999	40	94	16	12
September .....	1	738	29	183	130	15	1	977	39	..	..	..
October .....	..	.....	.....	225	150	10	1	1025	41	199	67	9
November .....	..	.....	.....	215	120	6	1	735	29	67	165	12
December .....	..	.....	.....	.....	..	..	1	906	36	52	92	10
Totals .....	1	3634	.....	1416	786	9	1	10764	.....	807	607	10
												..

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MALAGA BARRENS.						MONTAGUR.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January .....	2	3087	123	447	373	18	..	1	526	21	25	30	10	..
February .....	2	2031	81	395	171	15	..	2	482	19	52	74	8	..
March .....	1	1684	67	343	303	17	..	2	652	26	46	66	10	..
April .....	2	1974	79	378	332	8	5	3	618	24	70	171	5	..
May .....	2	1965	78	376	311	..	..	2	297	12	6	159	11	..
June .....	2	1965	78	301	326	9	5	1	452	18	82	91	14	..
July .....	2	2239	89	340	390	8	..	2	755	30	89	99	16	..
August .....	2	2760	110	338	431	18	..	2	1189	47	80	71	1	..
September .....	2	2630	105	505	540	17	15	3	983	39	30	173	8	..
October .....	2	2831	113	146	52	8	..	3	1180	47	116	365	5	..
November .....	2	2715	108	396	352	8	12	3	1544	62	152	365	9	..
December .....	2	2805	112	423	388	16	..	3	1608	64	205	232	13	6
Totals .....	2	28686	..	4388	3976	3	13	2	10286	..	953	1901	10	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	OLDHAM.						RAWDON.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January .....	2	1384	55	175	149	2	18	..	25	1	60	139	..	..
February .....	2	1225	49	149	134	18	6	..	30	1	90	179	..	..
March .....	2	1134	45	139	302	4	0	..	30	1	100	211	..	..
April .....	..	.....	.....	144	804	14	12	..	40	2	120	255	..	..
May .....	..	72	3	132	503	7	10	..	30	1	120	350	..	..
June.....	..	43	2	103	35	8	0	..	40	2	120	394	..	..
July .....	1	580	23	132	69	0	0	1	1505	60	100	352	..	..
August.....	1	727	29	94	173	3	18	1	1495	59	100	189	10	..
September ..	1	681	27	115	114	12	2	1	1299	52	85	218	..	..
October.....	1	834	33	.....	..	..	..	1	1214	48	100	71	..	..
November ..	1	884	35	117	148	3	0	1	759	30	50	..	..	..
December ..	2	841	33	91	274	7	0	1	725	29	.....	...	..	..
Total .....	1	8405	..	1391	2709	0	18	1	7192	...	925	2358	10	0



MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	RENFREW.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January .....	2	666	26	...	...	..	..	1	1404	56	210	66	..	..
February .....	2	790	31	...	...	..	..	1	1387	55	620	255	..	..
March .....	2	886	35	...	...	..	..	1	1461	58	674	159	..	..
April .....	3	1366	54	336	179	7	14	1	1365	54	520	198	..	..
May .....	2	622	25	237	241	..	1	1	1350	54	650	252	..	..
June .....	2	800	32	205	116	5	..	1	1309	52	550	160	10	..
July .....	2	861	34	20	35	15	..	1	1308	52	800	157	..	..
August .....	2	740	29	...	...	..	..	1	1619	64	800	219	..	..
September .....	2	553	22	...	...	..	..	1	1258	50	659	156	14	..
October .....	1	307	12	150	91	10	..	1	1741	69	600	103	..	..
November .....	1	325	13	110	23	..	..	1	1595	64	800	149	10	..
December .....	1	225	9	12	11	..	..	1	1596	64	750	157	..	..
Totals .....	2	8141	....	1070	697	17	15	1	17393	....	7633	2032	14	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MINES REPORT.

MONTH.	SHELBROOKE.						STORMONT.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.				Oz.	Dwt.	Gr.
January ..	2	586	23	276	45	8	12	1524	61	236	139	10	..
February ..	1	240	9	0	0	0	0	1324	53	255	143	10	..
March....	1	260	10	280	46	9	0	1219	48	274	170	10	..
April .....	1	600	24	36	5	8	0	1346	54	247	175	10	..
May.....	1	113	5	200	29	1	0	1416	56	280	148	5	..
June .....	1	140	5	221	32	9	0	1430	57	238	188	2	..
July .	2	130	5	0	0	0	0	1434	57	269	162	0	..
August .....	2	401	16	0	0	0	0	1169	46	191	94	6	..
September .....	1	804	32	0	0	0	0	1411	56	244	137	16	..
October .....	3	690	27	390	59	19	0	1282	51	227	148	6	..
November ..	3	460	18	110	17	13	5	1311	52	272	138	6	..
December ..	2	833	33	105	10	10	0	1453	58	192	100	6	..
Total.....	2	5257	..	1618	243	17	17	16319	...	2925	1745	6	..

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	TANGIER AND MOOSELAND.						UNIACKER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January .....	..	251	10	..	..	..	2	1025	41	23	92	15	..	
February .....	..	199	8	..	..	..	2	949	38	398	105	15	20	
March .....	1	265	10	35	12	10	2	1154	46	149	122	9	15	
April .....	..	92	3	14	3	2	2	1058	42	130	121	8	..	
May .....	1	427	17	35	14	3	2	1376	55	112	97	11	15	
June .....	2	269	10	20	15	7	2	1401	56	80	86	10	..	
July .....	1	234	9	76	9	5	2	1036	41	160	112	12	..	
August .....	..	321	13	6	..	15	2	1066	42	230	185	12	..	
September .....	1	189	7	73	18	10	2	1016	40	268	106	4	10	
October .....	1	412	16	50	14	11	2	1081	43	255	151	11	2	
November .....	1	249	10	65	13	6	2	1071	43	261	132	13	15	
December .....	1	260	10	53	10	13	2	1074	43	230	75	8	4	
Totals .....	1	3168	....	427	112	4	2	13307	....	2296	1390	11	9	

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WHITBURN.						WINE HARBOR.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January .....	4	2581	103	98	125	16	1	121	5	..	..	..
February .....	4	2495	99	53	105	10	..	68	2	64	49	9
March .....	4	2248	89	72	157	3	..	39	2	92	59	7
April .....	3	2385	95	135	255	6	1	537	21	40	7	15
May .....	3	2744	109	161	252	9	1	245	10	3	3	..
June .....	3	2727	109	147	193	14	1	372	15	..	..	..
July .....	3	1897	76	180	241	9	2	367	14	176	146	10
August .....	4	2732	109	147	236	1	1	250	10	131	58	18
September .....	4	3110	124	139	205	7	1	315	12	..	..	..
October .....	4	2243	89	181	221	9	..	4	..	..	..	..
November .....	4	2197	87	183	347	17	..	8	..	113	43	14
December .....	4	1234	49	143	98	9	..	29	..	88	45	5
Totals .....	4	28593	..	1639	2440	15	1	2355	..	707	413	18
						18					6	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	UNPROCLAIMED DISTRICTS, &c.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.
January .....	5	2227	89	83	76	7
February .....	4	2787	111	81	68	4
March ..	5	3399	136	169	165	10
April ...	3	1338	53	463	97	4
May.....	7	1516	60	118	82	8
June. ....	8	2521	100	267	149	5
July.....	5	856	34	419	137	8
August. ....	5	1691	67	98	62	5
September .....	3	696	27	142	79	18
October .....	8	2552	102	129	36	16
November .....	7	1700	68	97	33	3
December .....	6	1258	50	89	47	8
Total.....	5	22541	.....	2155	1035	18
						15

## MINES REPORT.

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## GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Grs.		Oz.	Dwt.	Grs.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
Total	482316	16	21	650442	.....			4,314,902	.....	.....

## INTERCOLONIAL RAILWAY.

*STATEMENT showing number of tons of Coal received at the following Stations from Mines in Nova Scotia for year ended 31st December, 1889.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax . . . . .	43120.25	Moncton . . . . .	16695.25
Dartmouth . . . . .	7384.00	Salisbury . . . . .	1007.50
Rocky Lake . . . . .	438.25	Petitcodiac . . . . .	111.00
Windsor Junction . .	5979.00	Penobsquis . . . . .	1330.50
Wellington . . . . .	89.75	Sussex . . . . .	267.25
Enfield . . . . .	557.75	Apohaqui . . . . .	6.00
Elmsdale . . . . .	146.50	Norton . . . . .	166.00
Milford . . . . .	65.75	Bloomfield . . . . .	6.00
Shubenacadie . . . . .	370.50	Hampton . . . . .	549.50
Stewiacke . . . . .	500.00	Rothsay . . . . .	155.50
Brookfield . . . . .	100.50	Cold Brook . . . . .	6320.75
Truro . . . . .	8439.50	Saint John . . . . .	42214.00
Valley . . . . .	11.00	Weldford . . . . .	24.00
Riversdale . . . . .	6.00	Kent Junction . . . .	3.94
West River . . . . .	18.00	Chatham Junction . .	499.00
Glengarry . . . . .	12.00	Derby . . . . .	23.00
Hopewell . . . . .	1459.50	Newcastle . . . . .	86.00
Stellarton . . . . .	6042.00	Gloucester Junction	471.50
New Glasgow . . . . .	20806.25	Bathurst . . . . .	18.00
Pictou Landing . . . .	72464.00	Millerton . . . . .	36.00
Pictou . . . . .	7409.50	Jacquet River . . . .	12.00
Belmont . . . . .	88.75	New Mills . . . . .	18.00
DeBert . . . . .	21.00	Charlo . . . . .	18.00
East Mines . . . . .	18.50	Eel River . . . . .	6.00
Londonderry . . . . .	75187.25	Dalhousie . . . . .	66.50
Folleigh . . . . .	.50	Campbleton . . . . .	111.50
Wentworth . . . . .	54.00	Metapedia . . . . .	755.50
Westchester . . . . .	18.00	Causapscat . . . . .	6.00
Greenville . . . . .	24.00	Cedar Hall . . . . .	6.00
Oxford Junction . . .	1167.50	St. Octave . . . . .	12.00
River Philip . . . . .	6.00	Ste. Flavie . . . . .	12.00
Salt Springs . . . . .	10.00	Rimouski . . . . .	12.00
Athol . . . . .	32.00	Trois Pistoles . . . .	52.00
Maccan . . . . .	6.00	St. Eloie . . . . .	6.00
Nappan . . . . .	30.00	Riviere du Loup . . .	2298.50
Amherst . . . . .	6691.00	St. Roche . . . . .	14.00
Aulac . . . . .	1969.50	St. Charles Junction	11.50
Sackville . . . . .	3355.00	St. Henri Junction . .	20065.50
Dorchester . . . . .	3135.50	Chaudiere Junction . .	83273.00
Memramcook . . . . .	126.00	Point Levis . . . . .	11028.50
Painsec Junction . . .	6.00	Eastern Extension . .	2377.25
Shediac . . . . .	436.00	West of Chaudiere . .	43040.50
Point du Chene . . . .	16.00	Total . . . . .	501201.50

# MINES REPORT.

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## STATIONS FROM.

STATIONS.	No. Tons.
Stellarton .....	17215525
Westville .....	2337950
New Glasgow .....	3997675
Spring Hill .....	22808500
Maccan .....	3760500
Total .....	50120150

Moncton, N. B., February 4th, 1890.



MINES REPORT.

INTERCOLONIAL RAILWAY.

Statement showing the Quantities in Tons of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway during the year 1889.

MONTH.	SPRING HILL.		ACADIA				DRUM-MOND.	BLACK DIAMOND.	JOGGINS.	CHIGNECTO.
	Round.	Run of Mine.	Slack.	Round.	Run of Mine.	Nut.	Slack.	Coke.	Round.	Round.
January .....	12010	543	.....	6196	21	.....	101	12	1804	1975
February .....	2842	17	.....	1348	.....	.....	81	.....	1881	3182
March .....	8104	37	.....	2475	21	.....	102	.....	2226	1937
April .....	5987	28	.....	2283	.....	.....	84	.....	2156	296
May .....	9764	.....	.....	2474	.....	.....	15	12	1856	216
June .....	7620	.....	.....	1348	.....	.....	11	.....	1340	457
July .....	6087	.....	.....	1956	16	22	.....	12	1041	.....
August.....	10870	.....	14	4239	.....	26	159	.....	1561	100
September .....	6791	.....	.....	2955	.....	.....	69	13	1493	20
October .....	9512	.....	.....	3554	.....	.....	62	.....	1603	845
November .....	10619	.....	14	3034	.....	.....	112	.....	1584	.....
December.....	10688	.....	.....	3047	.....	.....	117	.....	1896	.....
Totals.....	100394	625	28	34909	58	48	863	49	20441	8428
										100

The quantity of Coal carried from the Mines in Nova Scotia to the Upper Provinces was not quite as large as last year, as will be seen by the following comparative statement for the year which ended 31st December:—

Tons.		Tons.	
Moncton, N. B.,	1879.....	570	1884.....
Feb. 4, 1890	1880.....	10,246	1885.....
	1881.....	30,629	1886.....
	1882.....	35,089	1887.....
	1883.....	54,891	1888.....
			112,898
			165,791
			175,512
			192,022
			173,732

# MINES REPORT.

CO

## MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

### GYPSUM.

	Tons.	
†Baddeck and outports .....	1,490	\$ 1,450
†Windsor.....	133,323	123,323
†Cheverie .....	18,800	14,486
†Walton.....	3,235	2,953
†Halifax .....	496	1,738
	147,344	\$143,950

### MANGANESE.

	Tons.	
†*Windsor.....	36	\$2,178
†Loch Lomond.....	31	

### ANTIMONY.

	Tons.	Value.
†Rawdon .....	30	\$695

### MOULDING SAND.

	Tons.	
†Windsor.....	170	\$680

### COPPER ORE.

	Tons.
Coxheath Mines .....	500

### BUILDING STONE.

	Tons.	Value.
†Wallace.....	3,721	\$ 35,117.00
†Pugwash.....	180	720.00
do. ....	1,000	
†Hawkesbury .....		79.00

### MANUFACTURED GRINDSTONES.

	Value.
†Amherst .....	\$ 7,128.00

† Amount exported.

\* Amount mined, 81 tons ; average 5 men and 2 boys employed.

MINES REPORT.

LIMESTONE.			Value.
*Pugwash .....	Tons,	50	
Chester .....	"	200	
Bras d'Or Lime Company, } Marble Mountain, C. B. }	"	5,900	
Other Cape Breton quarries.....	"	5,000	
Brookfield .....	Barrels,	17,363	
*Arichat.....	"	10,576	\$10,576.00

IRON MINING.

Londonderry .....	Tons,	41,619
Bridgeville, Pictou Co. ....	"	†3,156
Brookfield, Colchester Co.....	"	1,732
Newton Mills, Colchester Co. ....	"	400
		45,907

AVERAGE FORCE EMPLOYED DAILY—LONDONDERRY.

On Mining.

	Men.	Days' Work.
Skilled labor, underground .....	62	16,847
" " above ground.....	13	3,993
Unskilled labor, " .....	29	7,502
" " underground .....	57	15,266

Limestone Quarry, Brookfield.

Skilled workmen .....	3	775
Unskilled workmen .....	24	4,561

Estimated number of men employed on an average in iron mining, Pictou County and elsewhere, 25.

The Mining and Mineral Statistics of Canada for the year 1888 show the following figures :

Building Stone.....	42,059 c. yds.	Value, \$120,245
Lime .....	29,450 bus.	" 6,480
Brick.....	7,060,000	" 46,695
Tiles .....	30,000	" 2,070

\* Amount exported. † Londonderry took 156 tons of Bridgeville ore.



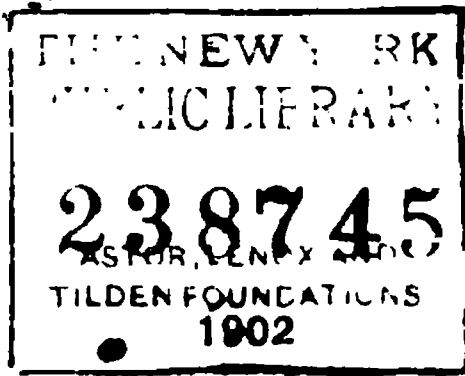


REPORT  
OF THE  
DEPARTMENT OF MINES,  
NOVA SCOTIA,  
FOR THE YEAR 1890.

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HALIFAX, N. S.:  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.  
1891.



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DEPARTMENT OF MINES.

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REPORT FOR THE YEAR 1890.

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*To His Honor MALACHY ROWES DALY, Esquire, Lieutenant-Governor  
of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR.—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,  
*Commissioner of Public Works and Mines.*

HALIFAX, March 3rd, 1891.



# REPORT

## ON THE

# MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, Jr., A. M., F. G. S.,

Fellow of the Royal Society of Canada, Member of Canadian  
Society of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, March 1st, 1891.

TO THE HONORABLE  
CHARLES E. CHURCH, M. P. P., M. E. C.,  
*Commissioner of Public Works and Mines:*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending December 31st, 1890.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1890, compared with that of the previous year:

		1889.	1890.
Gold.....	Ounces..	26,155	24,358
Iron Ore .....	Tons....	45,907	51,191
Manganese Ore .....	" .....	67	266
*Coal raised .....	" .....	1,756,279	1,984,001
*Coke made .....	" .....	35,565	36,738
†Gypsum .....	" .....	147,344	146,003
Barytes. ....	" .....		
† Grindstones, etc. ....	" .....	18,000	8,385
†Moulding Sand.....	" .....	170	170
†Antimony Ore .....	" .....	55	26
Limestone. ....	" .....	19,000	35,000
Copper Ore.....	" .....	500	1,000

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

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\* Ton of 2240 lbs.  
† Amount exported.  
‡ Value in dollars.

In addition to detailed notices of the operations of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced, not paying royalty to your Honorable Government.

I beg, also, to enclose the reports of Wm. Madden, Jr., Esq., Deputy Inspector for the counties of Cumberland, Colchester, and Pictou, and of P. Neville, Esq., Deputy Inspector for the Island of Cape Breton. These gentlemen have performed their duties during the past season in their usual careful and attentive style, and, by frequent visits to the collieries under their charge, they have stimulated cautious management and compliance with the requirements of the Mines Regulation Act.

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## COAL TRADE.

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The trade has made satisfactory progress during the year 1890, and would, presumably, have shown higher figures, but for the strike at the Springhill Collieries.

The total sales for the year 1890 amounted to 1,786,111 tons, against 1,555,107 tons in 1889.

As compared with the sales of the year 1889 the most noticeable points are :—

The home sales were 601,956 tons as compared with 550,425 tons in 1889.

The Province of Quebec took 751,931 tons against 631,796 tons in 1889, and 678,321 tons in 1888.

The sales to New Brunswick were 224,776 tons as compared with 195,174 tons in 1889. The sales to Prince Edward Island and Newfoundland show an increase. The United States and the West Indies also took more coal than during the preceding year.

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### CUMBERLAND COUNTY.

The total sales of the County were 438,608 tons against 419,628 tons during the year 1889. The sales would have been larger but for a strike at the Springhill Mines, lasting over two months.

The production of the Collieries of the Cumberland Railway and Coal Company was 419,012 tons. During the past season the

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principle of isolating the seams has been partially carried out. In the case of fire this would prevent the loss of all the workings hitherto connected. Extensive improvements and alterations have been made above and below ground, and the work of deepening the slopes has been energetically pushed forward.

The returns show a production of 10,121 tons at the Chignecto Colliery. During the season the mine has been closed down, and attention turned to a search for overlying seams.

At the Joggins Mine the output was 60,876 tons. Changes have been made in the management of this mine, and a system of long wall work was adopted last fall. So far it appears to work well, and yields very good coal. The railway from Joggins to Maccan has enabled this mine to maintain a steady output all the year round.

A good deal of prospecting was done at various points by the Saltsprings Coal Co., Londonderry Iron Co., Mr. Sharp, and others.

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### PICTOU COUNTY.

The total sales were 430,509 tons against 383,482 tons in 1889, and 418,893 tons in 1888.

The home sales were 277,753 tons compared with 247,708 tons in 1889.

The Province of Quebec took 90,461 tons, as against 73,261 tons in 1889.

The Acadia Company raised 274,932 tons, and the Intercolonial Company raised 107,739 tons. The output of the Black Diamond Mine was 33,277 tons.

At the Intercolonial Colliery extensive workings were pushed into the Holmes area, and the coal found to be of good quality. Preparations are being made at this mine for erecting a powerful hoisting engine to draw coal direct from the dip workings, and to do away with the intermediate engine. Further work in the second seam leads to the hope that next season it will furnish a large supply of coal of good quality. The manufacture of coke has been commenced here and the results are pronounced satisfactory.

At the Black Diamond Colliery the extraction of pillars has been continued.

At the Collieries of the Acadia Coal Company a new hoisting engine has been procured for the Acadia Slope. The work of re-opening the Ford pit has been steadily carried out. The old work-

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ings have been isolated, and levels, etc., are being driven in the bottom coal, leaving a cover of twelve feet of coal between them and the old workings in the upper portion of the seam.

This bottom coal is of good quality and makes an excellent coke.

Stanley heading machines are being introduced to facilitate driving the levels, etc. At bank, new coke ovens are being built close to the pit, and so arranged that the waste gases may be utilized for heating the steam boilers of the pumping and winding plant.

At the Vale Colliery, in the six feet seam, a long wall system of working has been introduced, and tests will be made of coal cutting machinery.

The East River Colliery is still being worked by the Messrs. Muir. Mr. T. Turnbull, in the fall, re-opened the Mitchell mine, lying east of the Vale area.

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I append the report of Mr. Madden on the Collieries of Pictou and Cumberland Counties during the past year :

WEESTVILLE, N. S.,  
31st Dec., 1890.

E. GILPIN, ESQ.,  
*Inspector of Mines, &c., &c.*

DEAR SIR,—I beg leave to present you herewith the annual statement of my official work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland for the year ending the 31st day of December, A. D., 1890.

INTERCOLONIAL COAL MINING COMPANY, WESTVILLE.

During the year an attempt was made to connect the workings of No. 4 slope with the workings of slopes Nos. 1 and 2 for the purpose of hoisting the coal to surface at one outlet. The water, however, became so heavy that the sinking and other necessary operations in this line had to be discontinued and the connection has not been made. In No. 4 they continued drawing pillars until June, when work was stopped, and the men were transferred to No. 1 slope, which was then worked double shift.

In March, the levels going south in No. 1 Slope were driven to the limits of the area on that side, and beyond the barrier, into the adjoining area. In October, they started drawing the pillars near the line. About the same time operations were resumed in the Scott Pit, with the idea of testing the coal, which is the second seam in

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this district, that is, it immediately underlies the seam or vein on which Slopes Nos. 1 and 2 and 4 are driven, a vertical distance of about 300 feet separating them. It has been a general idea that this second seam or vein, to the dip, would improve in quality, and the management has fully determined to satisfy themselves upon this point. In this year much labor and care has been bestowed upon the air-ways in the old slopes (Nos. 1 and 2), by in many places repairing and enlarging them; the results have been satisfactory. It has been decided to make further extensive improvements, by erecting larger and more powerful winding engines on the bank, enabling them to hoist not less than from twelve to 15 boxes from a depth of from 4,000 to 5,000 feet, instead of only seven boxes, as heretofore, thus permitting them to do away with the underground engine at the 1700 feet level. The old slopes have been timbered, and rails laid to the 3300 feet level, in preparation for the changes.

New buildings and repairs have been made as follows: twenty-five beehive coke ovens, one new magazine built, and a new machine shop built, in which some very fine tools have been placed, such as drills, lathes, planes, &c.; also, a new building for the workmen, as a shelter from the storms; also, a new storehouse, a new fire-engine house, to contain engine and 2,000 feet of hose, buckets, &c. Fifty new hoppers, of six tons capacity each, were added to the rolling stock; the blacksmiths' and carpenters' shops, stables, and many of the miners' dwellings, were shingled and repaired. The railway bridges, on their own line of railway, received considerable attention, and were thoroughly repaired in the spring of the year.

#### ACADIA MINES, WESTVILLE.

Work has been very steady at this mine for the past year, pillar working in the 3100 ft. lift forming the principal feature. It is now nearly finished, and has been very successfully prosecuted, a large percentage of coal having been obtained. In the next lift (3560) three thousand five hundred and sixty feet, the levels on the north side have been driven 2000 feet, and are now stopped. On the south side the levels have been driven some 2,500 feet, and are still working. Considerable trouble has been encountered in these levels from bad roof. Iron booms have been very successfully used and their value as a good substitute for wood fully demonstrated, especially in main hauling roads and air-ways; for example, seven years ago on a section of bad roof some railroad rails were utilized as booms to support the roof and to-day are as good and solid as when placed in position, while around them wooden supports have been renewed three times, the timbers, owing to dry-rot, etc., standing only about two years. Now when they have very bad roof in such places as mentioned iron booms are used, and when no longer required are drawn for use in some other locality. Two balances, one on south side and one on north side, are driven up to the 3100 feet level. A large new brick engine house for the large hoisting engine formerly used at the Vale has been built. Also a new Duplex pump has been put in operation at the 3560 feet



lift. They have considerable fire damp and bad roof to contend with, but are successfully meeting such difficulties, and have been free from any accidents throughout the year.

#### VALE COLLIERY.

*McBean Seam.*—At this mine, which unfortunately about a year ago caught fire, the coverings of the Travelling slope and East intake were removed on the 22nd March, and left open for a few days, when, the temperature beginning to rise rapidly, it was deemed best to close them up again. It has remained in this situation since that time.

*Six Feet Seam.*—Work has not been very actively prosecuted here. In August, in the west side, 3rd Balance, 1,000 ft. lift, they began drawing the pillars. The levels going east and west on this lift were stopped. In the lower lift the levels on both sides are being driven, and at the 1st of November a change of management was made,—Joseph Dakers, a man who has had large experience in long wall working, taking the position of T. W. Turnbull, underground manager, who has retired. A system of long wall working was then introduced by Mr. Dakers. The Elliott improved combination locked rope, mentioned in last report as being in use at Vale Colliery, has been in use during the year, in a wet slope, and to all appearance is as pliable and trustworthy as when new. This would appear to be a fair test of this rope, as it has been now in steady use two and a half years.

#### MCGREGOR PIT, STELLARTON.

At this pit they have been opening up the lower lifts; the coal is strong and gives off considerable gas, so that it was found necessary to prohibit the use of powder on the lower lift, south side. This made a very difficult job of driving the balance. They have, however, succeeded and started eleven bords on south side balance. The balance west side of south slant is up and bords started off; the air being increased by getting those places through, so that powder is now again used in the lower shift, south side. The balance on south side north slant is also driven up, and air likewise increased largely. The pillars along the crop have been very successfully won. A new place has been driven to the surface with the view at some future day to utilize it for a hoisting slope, doing away with the shaft and underground engines.

The largest volume of air of any mine in the district I inspected circulates on this pit; yet, as it is, I believe, one of the most gaseous coals. The use of powder requires careful discrimination, and in many places of the mine powder is not used. This mine has been almost free from accidents. John Dunbar, the efficient Underground Manager, while going down a head driven in a very steep angle, lost his balance and fell about 15 feet, breaking three of his ribs.

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DOUGLAS SLOPE.

*No. 2.*—This slope has been cleaned up and timbered. On Sept. 1st the mine bords and levels going east and west were started to work. The drift which, about six months ago, was driven with the aim of catching the Cage-pit seam, has been excavated through rock and stone, etc., a distance of 250 feet, at which point the Cage-pit seam was struck, thus winning a large field of coal for this slope to handle. Boreholes to tap the drift connecting the Cage pit and Foord pit were put through, and the water of 3rd seam is now running to the Foord pit. The work done in this slope must have caused considerable anxiety to the management, as well as a large expense to the owners being difficult and arduous. It has been successfully done, however, and no accident of any kind has occurred.

## FOORD PIT.

The resuscitation of this mine has been a triumph of skill, energy and perseverance. I doubt if ever a much more arduous undertaking has been accomplished in mining matters. The pit is somewhere in the vicinity of 1,000 feet vertical depth, and laying to the dip of the old and very extensive workings, with connections into them, received all the water of these old workings. When the bottom was reached, it was found that the workings were completely crushed. H. S. Poole, Esq., to whose unquestioned ability and large experience much of the success attending the restoration of this magnificent colliery is due, commenced work on what is known as the Big Coal, a stratum of coal immediately underlying the previous workings. About this time Mr. Wells, a mining engineer of large experience in mining as well as in mining machinery for cutting, hauling and screening coal, became associated in the management of this mine, and I have no doubt that next year I will be able to give a good report of the operations carried on at the Foord pit. He has introduced mining machines to work in the Foord pit, and intends erecting one at the 6 foot seam, Vale Colliery. He is also having some coke-ovens built close to the mine, and intends using the gas from the ovens to heat the boilers. I need scarcely add this is a new feature here.

Mr. Getting, another man who has been added to the staff at Albion Mines, is in the Foord pit, working in conjunction with William Purves and Donald Gillis, as there are three shifts in the mine at present.

## BLACK DIAMOND MINE, WESTVILLE.

This mine has been kept pretty steadily at work during the year, pillar working forming the principal feature. They began some 1500 feet down the slope drawing the pillars that had been left to support the travelling and main slopes, and are succeeding in getting some very fine clean coal. Although this mine was when last opened in

a very bad condition and a large amount of repairing required, it has fortunately been very free from accidents—nothing worth reporting, excepting one which I regret to say resulted in the death of a very fine young man. Considerable prospecting with the Diamond Drill, and in the usual way, has been done, the result so far not very encouraging, but they have a large area to prospect yet.

Mr. Thomas W. Turnbull, late Manager of Vale Colliery, has begun work, opening up the old Barton Mine, adjoining the Vale Colliery area. On December 22nd, he had some six or eight men employed driving a slope out to surface, also doing necessary timbering and repairing, preparing to supply local demands.

On April 3rd and 4th, I visited Antigonish, to investigate a fire supposed to be in a coal seam. On arriving there, I found some shale of a bituminous character on fire, but did not consider any immediate danger, as through the lapse of time it would inevitably burn out.

On January 18, I visited Londonderry, to ascertain if the appliances required by law, when men were riding on rakes, was being observed. On investigation, I found the law complied with, and the management preparing travelling-roads, to obviate the necessity of men riding in cages hereafter.

#### EAST RIVER AREA.

*John Muir and Sons.*—Work has been carried on in a small way for the most part of the year, except in September and a part of October. The engine-house accidentally caught fire and was, unfortunately, burned, destroying the boiler and seriously injuring his engine, which were in the building. He got his engine repaired and a new boiler put up. During the year a short siding from the Vale railway was laid, to accommodate Mr. Muir. This will be a valuable assistance to Mr. Muir, as hitherto he had to truck all his coal to New Glasgow, his nearest shipping point, a distance of from three to four miles. During the summer months very little work is done; in winter he employs six to eight extra hands, as his local sales increase.

#### SPRING HILL MINES.

At my visits to these mines I always found the work carried on efficiently and the law observed. The air is kept well up to working faces and the ventilation good. I herewith give a summarized statement of the general repairs, new machinery and general additions to plant, and advances made in the general work during the year.

*Boilers.*—A regular system of boiler inspection is observed, which would be well if more generally attended to in all places where boilers are in use.

First, they are “blown off” every fourth day, “washed out” every

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fortnight, examined and tested with cold water pressure every six months. Number of boilers, 28. Eight locomotives are kept employed. New riding rakes for lowering and hoisting the men have three draw bars with chain connections except the one attached to rope in which is Smallman's patent clip used as a bridle chain to attach to rope for safety. A new fire-proof fan house built at North Slope; engine connected direct with fan. At West Slope engine connected with fan direct. A new foundation placed under fan at East Slope.

At the East and North Boreholes used for sinking purposes, new concrete foundations have been laid.

New air-chamber on the Allison pump West Slope. Barometers, thermometers and water-gauges are placed in the fan houses. Air-mometer supplied to each slope. Air measured daily; separate splits weekly. West Travelling Slope thoroughly timbered from surface to 800 ft. level. West main slope and pump slope re-timbered. East Slope re-timbered from entrance to bottom. At the entrance to the other slopes some new sets put in and new steps. The capacity of the airways at East, West and North Slopes have been increased to double their former areas; results in the increase of air very satisfactory. Bankheads are all newly stepped and repaired for convenience of the men getting on and off riding rakes.

Two new dams, capable of holding 2,893,000 gallons of water, have been built in a ravine; this, with their previous dams, gives them a reservoir capacity at the collieries of 4,289,500 gallons of water. A stopping 12' wood, 6' stone and lime has been built between No. 5 and West Slope. The Tunnel between North and East Slope at 1300 feet level has been built off with a brick and current stopping, form egg-shape length, 14' 6" at 800 feet level, another stopping, same shape and material, length, 9' 6". Two new overcasts, built of stone and brick, with iron girders, have been built at 1500 and 1900 feet levels. Iron booms are being introduced into airways and pipe heads. A new brick engine house for hoisting engine built at East Slope and another at West Slope. Two new cupolas have been built during the year, and two of the old ones had a piece added to top. Mules have been introduced into the mine, and they have ten of these animals on the ground for work.

A bore-hole, 3½" diameter inside of casing, depth, 826 feet, has been put down on the East seam to be used for sinking purposes. An engine being placed on top the rope runs down through the hole. Another bore-hole, of same diameter, depth, 850 feet, is put down on the West seam, and steam-pipes run down it to supply a pump with steam. About 300 safety lamps have been provided during the year and 50 acres of ground cleaned and fenced. The height of smoke stack increased by adding 40 feet. Blank report forms filled in daily by all persons in charge and sent to Manager's office to be approved and signed by him. Both above and below ground they

have same system, that is they report daily. Overman's reports are sent to head office in Montreal daily. While extracting pillars on 1300 feet level West Slope, a very heavy feeder of water was struck. Also considerable water came from 800 feet level so much that the combined volume necessitated the flooding of the 1900 feet lift of north slope to save 1900 feet lift on east slope, on which lift a large portion of their coal was being won at that time. The water getting lighter an extra pump was placed at the 1900 ft. lift north slope, and by this means the water was all removed. The steam used in driving the pump was taken down through bore-hole formerly used to sink from the 1300 to 1900 ft. level. The north slope plant is moved from the 800 ft. level and all the coal from the north slope comes to this point. The pillars are being successfully won from the upper lift. In the east slope another lift has been sunk from the 1900 ft lift, making a total distance in the neighborhood of 2500 feet. The fire in the south slope is completely extinguished and it is now used as a return airway from north slope. Sometime during summer a fire originated in the north slope stables, and although rigidly investigated the origin of the fire is yet a mystery. Since that time the stables have been equipped with water tanks, furnishing a ready means for extinguishing fires, and are also well supplied with efficient hose, nossels, force pumps, engines, &c., &c. Stablemen are also, while on duty, provided with locked safety lamps. At my official visit Oct. 8th and 9th, a delegation, viz., John Madden and Matthew McPherson, sent from the workmen, in company with me, made a thorough inspection of the principal air-ways and waste workings. It is a matter of great pleasure to me to find men thus taking a lively interest in the workings and condition of the mine in which they are employed, and would meet my approval if more generally observed at all the Collieries. We found everything satisfactory.

#### LAWSON MINE.

A small amount of work has been done here during the year. The ventilation (natural) during July and August gave some trouble. Their pump is not of sufficient capacity, and, in consequence, the water gave them difficulty. Some prospecting was done in the month of October. Twenty-five men were employed in December.

#### MINUDIE.

Ten or twelve men worked here for the first three months of the year, taking out some very good coal, supplying local demands; it then remained idle from March to November, when work was again begun, and at my visit in December, twelve men were employed.

#### CHIGNECTO.

This mine worked on in the usual way until July, when most of the men were dismissed. Some 19 or 20 were, however, retained

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prospecting until late in the fall, when Mr. Frank Burrows, underground manager, took these men and began taking out coal along the crop-out on the eastern side of their works, and as it can be got water dry, the idea is to keep these men employed for the winter months in readiness for prospecting next spring.

#### SCOTIA.

Alexander Dewar began taking coal out of what was formerly known as the Scotia area, and on my visit in December he had 3 or 4 men employed.

#### JOGGINS.

Some time in the early part of the year, the new sinking, a distance of 600 feet, was finished, making a total distance of 1900 feet. It is supposed that the workings of the 1300 feet level have been driven into the water level, and, if this supposition be a correct one, it is a mistake that will take time and money to rectify. The mine worked on in its usual way until last October, when James Baird, Esq., assumed the management, and introduced some new changes, as well in the modes of working as in the management. The pipe-head was timbered and cleaned, and the old water-level timbered and cleaned, for half a mile or so. Long wall working was adopted in two-thirds of the mine, and the intention is, I believe, to have all the work done by this system. I have invariably found the air good, and the law carried out.

Last November a pump was placed at the lodgment of 1900 feet level to lift the water to lodgment of 1300 ft. lift. Some extensive and necessary repairs are being carried on to facilitate a larger output of coal to enable them to carry on operations in the most scientific manner.

The usual tabulated statements are likewise submitted accompanying this report.

I am, Sir,

Your most obedient servant,

WILLIAM MADDEN.

OFFICIAL VISITS, YEAR 1890.

MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Drummond . . . . .	3	4	4	2	3	4	3	4	8	13	4	2
Black Diamond . . . . .	4	1	3	8	2	12	4	9	12	14	.....	3
Vale Colliery, 6' seam . . . .	21	22	22	22	23	24	8	1	6	3	24	22
Acadia . . . . .	9	3	4	1	1	3	7	5	11	6	3	1
Joggins . . . . .	14	11	17	15	19	20	16	27	.....	10	11	15
Minudie . . . . .	14	11	17	Idle.	.....	.....	.....	.....	.....	.....	.....	15
Chignecto . . . . .	13	12	18	14	17	21	17	Idle.	.....	Idle.	10	13
Lawson . . . . .	13	12	18	15	Idle.	.....	.....	28	.....	Idle.	10	16
Londonderry . . . . .	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McGregor Pit . . . . .	22	8	6	7	7	9	5	6	10	15	20	5
No. 2 Slope . . . . .	22	9	6	7	.....	9	13	.....	9	15	Idle.	5
Foord Pit . . . . .	.....	.....	8	.....	7	13	.....	7	.....	23	.....	9
No. 4 Slope . . . . .	3	4	4	2	3	4	Idle.	.....	.....	.....	Idle.	.....
Scott Pit . . . . .	Idle.	.....	.....	.....	.....	.....	.....	2	8	13	4	3
John Muir & Son . . . . .	21	22	22	22	23	24	8	1	6	3	24	22
Antigonish . . . . .	.....	.....	.....	3, 4	.....	.....	.....	.....	.....	.....	.....	.....
Springhill Mines:												
East . . . . .	15	13	13	10	15	18	.....	25	.....	8	12	11
West . . . . .	15	13	14	11	15	18	15	23	.....	8	12	11
North . . . . .	16	14	15	12	16	17	.....	26	.....	9	13	12
No. 5 . . . . .	16	14	15	.....	17	19	Idle.	.....	.....	Idle.	14	10



Volume of Air in Cubic Feet, per Minute, circulating in the Pictou and Cumberland Coal Mines, 1890.

NAME OF MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Drummond .....	80,200	78,500	90,000	86,500	88,200	86,700	84,900	82,600	80,900	80,150	76,800	97,600
Black Diamond .....	13,700	13,200	14,100	13,700	13,200	13,700	14,100	12,500	13,200	14,150	14,300	13,900
Vale Colliery, 6' Seam. . .	27,600	29,500	28,700	24,300	24,650	27,700	22,950	41,600	40,850	42,100	35,125	36,000
Acadia .....	55,200	49,900	46,000	59,000	62,500	64,200	62,800	63,500	62,900	61,200	60,500	63,300
Joggins ..	25,400	40,000	38,600	34,400	30,200	31,100	32,240	31,700	.....	34,100	36,100	37,200
Minudie .....	4,000	3,700	3,100	Idle.	..	.....	..	..	..	..	.....	..
Chignecto .....	22,900	23,100	24,700	27,500	26,900	24,900	28,500	Idle.	..	..	.....	..
Lawson .....	1,500	Idle.	2,000	Idle.	.....	.....	.....	1,700	.....	.....	.....	1,900
McGregor Pit .....	90,200	90,600	91,700	98,460	91,842	90,000	82,700	83,700	83,236	98,700	99,895	105,426
John Muir & Sons .....	2,200	2,700	3,100	3,000	2,640	2,000	2,100	1,900	2,000	2,000	2,350	2,200
Drummond, No. 4 Slope....	15,500	14,900	14,200	14,850	15,200	16,000	Idle.	.....	.....	..	.....	.....
Scott Pit .....	Idle.	.....	.....	.....	..	.....	16,500	14,900	13,700	14,100	15,000	14,780
Douglas Slope .....	18,000	18,200	18,700	20,000	21,000	20,000	26,000	27,700	27,500	28,900	.....	40,700
Springhill Mines:												
East Slope.....	43,400	40,700	42,400	46,900	43,740	45,200	Idle.	48,500	Idle.	66,000	72,000	70,100
West " .....	47,300	42,900	45,200	42,700	43,200	40,800	Idle.	40,300	Idle.	62,200	64,600	66,500
North " .....	42,950	45,200	41,800	42,500	41,000	39,950	Idle.	39,700	Idle.	54,000	55,700	56,200
No. 5 " .....	7,800	3,200	4,300	6,700	5,250	6,200	Idle.	.....	..	..	.....	.....



Table showing number and lineal feet of Props, Booms, and amount of Explosives used at each Colliery during year 1890.

MINE.	PROPS.		BOOMS.		EXPLOSIVES.	
	No. of Pieces.	Lineal Feet.	No. of Pieces.	Lineal Feet.	Powder.	Roburite.
Springhill Mines	4,000 10,950 41,000	36,000 109,500 492,000	1,880 25,700 1,400	10' 14' 12'	17,500 lbs.	.....
Chignecto	6,370 3,507	38,220	750	14'	1,650	.....
Drummond Colliery	10,452 11,405 19,000	270,222 152,000 7,500	2,846 12,000 826	16' 10' 16'	4,941	7 1/4 oz.
Acadia	625	48,800	3,168	15'	14,642	.....
Albion	6,100	99,722	3,995	13'	25,394	.....
Vale	14,246	13,200	2,907	16'	1,875	.....
Joggins	2,200	7,200	1,670	10'	10,000	.....
"	1,800	37,500	1,000	13'	25'	.....
Lawson	15,000	7,200	.....	10'	.....	.....
Minudie	1,200	7,200	.....	.....	.....	.....
John Muir & Sons	400	1,600	.....	.....	450	.....
Black Diamond	Not given.	83,710	.....	.....	2,040	.....
Total	.....	1,403,374	.....	768,200	68,742 lbs.	7 1/4 oz.

## LIST OF ACCIDENTS FOR THE YEAR 1890.

No.	Date.	Mine.	Name.	Occupation.	REMARKS.
1	Jan. 2.	Drummond Colliery.	Joseph McPherson.	Driver.	Collar bone broken; box of coal capsized on him.
2	" 13.	Vale Colliery, 6' Seam.	Jas. B. Leloque.	Leader.	Burned slightly with gas.
3	" 24.	Forod Pit.	John McInnis.	Laborer.	
4	Feb. 17.	McGregor Pit.	Duncan McKenzie.	Miner.	Arm badly torn by a pick on a box.
5	" 20.	McGregor Pit.	William Dunbar.	Driver.	Severely hurt; kicked by a horse.
6	" 27.	Vale Colliery, 6' Seam.	A. D. McKenzie.	Underg'd manager.	Killed; fall of roof.
7	Mar. 21.	Springhill, North Slope.	John McPherson.	Miner.	Leg broke and other injuries, while taking out pillars.
8	May 20.	Springhill, North Slope.	Thomas Scott.	Overman.	Leg broke; box of coal on main level.
9	July 10.	Vale Colliery, 6' Seam.	Alex. W. Reid.	Miner.	Leg broke; fall of roof in main level.
10	" 26.	Vale Colliery, 6' Seam.	Archy Fraser.	Miner.	Fatally hurt; struck by cage on back balance.
11	Aug. 6.	Drummond, Scott Pit.	Joseph McPherson.	Cage-runner.	Arm broken; struck by piece of coal flying from a shot.
12	Sept. 1.	Drummond.	Wm McDougall.	Driver.	Got hurt; the boxes moved while coupling.
13	" 12.	McGregor Pit.	Rod. Kennedy.	Trapper.	Killed; rake of full boxes running over him on level.
14	" 16.	Black Diamond Colliery.	Albert Fraser.	Overman.	Fatally hurt; riding up on full rake.
15	Oct. 10.	Springhill, East Slope.	Charles Waugh.	Miner.	Leg broke; fall of coal from working face.
16	Nov. 12.	Vale Colliery, 6' Seam.	Alex. Plumb.	Brake-holder.	Leg broke; empty box came up too far. Some small trifling accidents not reported.

### CAPE BRETON COUNTY.

The total sales for this County were 916,994 tons, against 751,997 tons in 1889, and 738,250 tons in 1888.

The home sales were 223,732 tons, compared with 200,182 tons during the preceding year.

The sales to Province of Quebec were 480,462 tons, against 381,074 tons in 1889.

The production and sales of the various Cape Breton Collieries during the year 1890 were as follows :

	Raised.	Sold.
Bridgeport .....	28,223 tons.	28,692 tons.
Caledonia .....	156,174 "	145,373 "
Franklyn .....	723 "	723 "
Glace Bay .....	111,472 "	108,490 "
Gowrie .....	141,099 "	124,641 "
International .....	143,091 "	133,076 "
Ontario .....	9,049 "	8,387 "
Reserve .....	155,906 "	139,777 "
Sydney .....	181,571 "	160,468 "
Victoria .....	90,930 "	77,367 "

I beg to submit the report of Mr. P. Neville, of Bridgeport, Deputy Inspector of Mines :

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave to respectfully submit to you a report of my work as Deputy Inspector of Mines for the Island of Cape Breton during the year 1890.

#### GOWRIE MINES.

Work has been carried on its usual way, levels extended on both sides of the low lift and rooms broken off. On No. 1 lift west side the levels have been driven about nine hundred feet parallel to the stone troubles; it is found, as they advance, that the coal is dipping slightly to the south-west, so that the course of the levels are now going more northerly, gaining more grip on the seam. The management say it is their intention this winter to drive through and come out on the opposite side of the basin.

The slant road mentioned in last report on west side has been completed and gives good satisfaction. On bank a new tubular boiler of sixty horse power has been put in place, in addition to the others.

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**ONTARIO MINES.**

During last winter pumps were placed below No. 1 level for the purpose of drying the dip workings. The water was lowered by the 10th of June a distance of 200 feet to No. 2 level, and up to the last of September it was lowered to No. 3 level, a distance in all of 460 feet. From that date the pumps seemed to be getting out of order and the water raising. Finally work ceased on the 31st of October and pumps and pipes removed to the surface. The coal mined here during the season was taken from No. 2 section, north side between No. 1 and No. 2 levels. A few pillars have been drawn and split in No. 3, north side; also six rooms were worked at the face of the solid coal, below No. 1 level, south side.

**CALEDONIA MINES.**

Work has been brisk at this mine during the last season. The main deeps have been driven down 300 feet; No. 2 levels, above this, have been extended on the west and east sides, and rooms broke off and worked. A slant road has been driven from this east level coming out at the east side of the pit, for the purpose of drawing coal from that section. A small section of pillars have been drawn and split in the east side rise workings. A new double engine has been imported and placed on surface east of the hoisting shaft for the purpose of drawing the coal from the deeps. Also, preparations are being made to put a double furnace where the single one is now.

**LITTLE GLACE BAY.**

The operations at this colliery during the year has chiefly been the extension of rooms already gained and worked off the levels. The rooms south of the 1800 foot headway have been worked, and some of them drawn up to the Harbour pit workings. In the month of June, as the weather became calm and warm, the air was found dull on the west side of the pit upper workings. The management erected a cupola over the old furnace shaft at the Harbour pit, in order to make an upcast there, and have two separate returns. This did well for a while, until the weather got cool and blowy; and as it was found, owing to the tenderness of the roof, too expensive to build a furnace there, it was abandoned and a steam jet placed at the bottom of the pump shaft. This, with the heated pipe to the Cameron pump, sufficed for the time being. However, I am glad to report that Mr. Rigby has ordered an eight foot Fan Murphy Ventilator, which he says will be in operation in the early part of next summer.

**INTERNATIONAL MINES.**

The pit bottom has been retimbered; the back deeps have been driven, connecting No. 9 landing; laid and worked No. 8 and 9 landings. No. 6 section has been driven seawards to the barrier and stopped; south side drove and laid angle deeps, from pit bottom level

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to No. 1 landing on incline deep. This was done to cut No. 1 and No. 4 landing from north side engine and do away with the haulage of eight railroad horses there, and bring the coal into the opposite side of the pit bottom. The Ledgerwood engine, which had been used to bring the coal along the level, is now used for this purpose. The bankhead is 2,000 feet from the engine, and a tail rope is used along the level—the rope uncoupling automatically; the trip runs down the deep by gravity. On the surface a new nut screen and elevator have been erected, and another modified Rigg screen put in. Blowers were put in under the boilers, and fire-grates adapted to using fine slack coal. These have given every satisfaction. An air-shaft has been sunk, intended for an inlet. Mr. Hudson informs me that another shaft is to be sunk this winter, and a new fan and engine put in operation by the spring.

#### RESERVE MINES.

During last winter the east slope was driven down and a new lift of 600 feet gained, and levels turned off east and west. The west levels were driven three chains, and the east eight; back deeps were also driven and rooms broke off and worked parallel to the level. A new travelling road has been made up the back deep on east side. The barrier between No. 2, east side level, and No. 6, west side, has been pierced for the purpose of letting off the water from that section, which had been filled for a number of years. This done, it was found that the pump on the east side was not equal to the task, and a new pump has been placed at the bottom of the west slope to dry No. 6. The management say that it is their intention to extract and split pillars in that section next season. Ten pair of miners were employed drawing pillars west of this slope during the working season.

*The Emery Mine*, which had been idle for a number of years, and full of water, has this year been pumped out, and a pump placed below the bottom of the pit, by which the water is pumped up the shaft to the surface. This shaft has been repaired, and slides and cages put in. The coal is raised to bank in half-ton boxes. A bank-frame and engine-house have been erected, and an engine and boiler placed therein; also, a branch railroad of 400 yards has been built, connecting with the Reserve road. The levels in the west side of the pit have been driven about 700 feet, and headways driven towards the rise; rooms broke off and worked; these rooms are eighteen feet wide; pillars eighteen feet thick; cross-cuts twelve feet, and sixty feet apart. On the east side the old levels and rooms have been extended, and a pair of dip-slants is being driven, in order to gain a lift of 600 feet.

#### OLD BRIDGEPORT.

Levels and rooms have been extended on the south side of the pit. No mining has been done during the year north of the furnace headway. The band of the shale, spoken of in last year's report, was

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found to be quite thin in the levels or low rooms, and consequently it was taken down with the top coal, which made the seam about nine feet thick. However, as the levels advanced it was found again to thicken, and the management thought it more profitable to timber and keep it up than take it down. A section of pillars have been drawn from south of mine headway.

#### GARDNER MINES.

This property has been acquired by Messrs. Burchell Brothers. This property has been closed down since 1879, previous to which it was worked by the Gardner Coal Company. It was thoroughly equipped with the best machinery, some of which are still in excellent condition. Work commenced there in the latter part of the summer, getting everything in order to be ready for shipping at the opening of navigation next spring. Engine houses and miners' cottages are being repaired. A substantial pulley frame of some sixty feet high has been erected. The old boilers have been replaced by new ones. The water is being pumped from the mine by two double-acting sinking pumps, one a Knowles and the other a Dean. In a few more days the pit will be dry. I am informed that the seam is to be worked on the long wall system, or on the same principle that Gowrie mines seam is, having the rooms thirty feet in width. This may suit well, as the roof is so strong and regular.

#### VICTORIA MINES.

Work has been carried on at this mine in its usual steady way during the year. The east dips have been extended and a lift of 600 feet gained; this lift being free from water is completely dry; levels have been turned off east and west and driven 150 yards. A balance was driven upon the east side and rooms broke off. The levels on No. 2 lift are still being extended, in driving up the balance. Three places are put up instead of two as formerly. This gives a better opportunity of ventilating places and leaves safe travelling roads on each side of balance. There are only nine rooms working on the west side, and I am informed that the men are to be removed to the east side by the latter part of January where the seam dips less. A new Knowles pump has been put in place of the Blake pump, mentioned in last year's report. The coal that was supposed to be lost by the falling in of rooms on the west side of the fault, has been regained by driving rooms from the east, coming west through the fault. The management say that it is their intention, this winter, to place a double engine in the fan-house, and a new fan of larger dimensions than the one already there.

#### SYDNEY MINES.

I am glad to state that a great improvement have been made in this pit during the year for the safety of men's lives. New travelling ways have been made on the south side, a distance of 1700 yards.

On engine and incline planes, where the roadway was found narrow, additional manholes have been driven between the ones there already, according to law. On the north side bankhead landing, where the road was narrow, the place has been made wider for three hundred feet, so that there is now ample room to pass the standing or moving trips. No. 3, or pump deep, has been working since the 27th of May last. This is one of the submerged districts. The deeps have been extended three hundred yards in solid coal, and rooms broke off right and left and worked.

Electric signals have been placed from them to the engine house, at pit bottom, a distance of 1200 yards, a double line of wire enables signals to be given from any point of the road. Shinner's level district has been stopped for the present. The new angle deeps have not yet gone through the stone trouble. On surface three multitubular boilers have been put in place of as many of the old egg-end boilers.

You will observe by the table of Accidents, that there have been none this year caused by falling coal. This, I think, is greatly due to the Act passed the 15th of April last, enforcing the use of wooden props when required.

I remain,

Your most obedient servant,

P. NEVILLE,

*Deputy Inspector of Mines.*

## REPORT OF ACCIDENTS IN CAPE BRETON COLLIERIES DURING THE YEAR 1890.

DATE.	MINE.	NAME OF PERSON.	OCCUPATION.	AGE.	REMARKS.
March 5.	Victoria Mines. . .	Frank McDougald. . .	Loader . . . . .	19	Fell in front of full trip while riding up slope; died next day.
April 2. .	Gowrie Mines. . . . .	Alex McCosh. . . . .	Driver. . . . .	18	Killed by fall of stone from roof.
May 20 .	International . . . . .	John Gardner . . . . .	" . . . . .	19	Leg broke between prop and coal box.
Dec. 22. .	Sydney Mines . . . . .	Murdoch Morrison. . .	Errand Boy. . .	12	Killed by empty trip going over him.
June 12.	" . . . . .	John McDonald. . . . .	Laborer . . . . .	70	Run over by empty; died next day.
" 26.	Little Glace Bay	Joseph Morrison . . .	" . . . . .	32	Collar bone and rib broke in coal yard by full tub running down bank.
July 3.—	Reserve Mines. . . . .	William McLutchy . .	Miner . . . . .	37	Back broke by fall of stone from roof; died five weeks after.
" 18 .	Little Glace Bay	Neil McLellan. . . . .	Shift-man. . . . .	70	Two legs broken, fall of stone from roof.
Aug. 4 . .	Caledonia Mines . . .	Dougald McIntosh. . .	Miner . . . . .	27	Burned slightly by gas.
" 5 . .	Reserve Mines . . . . .	John McKenzie. . . . .	Driver . . . . .	16	Leg broke by empty trip on landing.
" 21 . .	Sydney Mines . . . . .	Rod. McDonald . . . . .	Shift-man. . . . .	70	Slightly burned by gas.
" " . .	" . . . . .	Henry Boner. . . . .	" . . . . .	36	"
Oct. 8 . .	International . . . . .	Mike McLean. . . . .	Miner . . . . .	27	Slightly injured on head and leg by fall of stone from roof.
Dec. 22. .	Caledonia Mines . . .	Donald McPherson . .	Driver . . . . .	19	Burned slightly by gas.





NUMBER AND DATES OF VISITS DURING THE YEAR 1890.

## MINES REPORT.

**25**

[illegible]

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### COAL—MISCELLANEOUS.

Some prospecting was done in the rear of Big Pond, East Bay, Cape Breton County. The following analysis of coal was made for the Rev. M. A. McPherson :

#### FAST COKING.

Volatile Matter .....	41.79
Fixed Carbon .....	44.98
Ash .....	13.23
	<hr/>
	100.00
Coke per cent .....	58.21

It yields a firm co-herent coke. The gases evolved during coking burnt with a yellow smoky flame. Color of ash, purplish brown. G. C. Hoffman, (Geo. Sur., Canada).

Discoveries of coal were reported from Parrsboro, Cumberland County, and from Middleton, Annapolis County.

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### SCHOOLS OF INSTRUCTION FOR MINERS.

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During the year 1890, the system of providing instructors to prepare candidates for examination for certificates of competency as underground managers and overmen was continued.

At the last session of the Legislature the Board of Examiners was reorganised by the following amendment to the Mines and Minerals Act :

1. Section 1 of chapter 7, Revised Statutes, Fifth Series, is hereby repealed, and the following substituted therefor :

The Governor-in-Council is authorized to select and appoint a Board of Examiners, whose duties shall be the examination of colliery officials under the provisions of the Mines Regulation Act, to be composed of the Inspector of Mines and nine persons conversant with coal mining, such persons to be appointed biennially by the Governor-in-Council, three of whom shall be mine managers, three working miners, and three experienced mining engineers, or men of practical ability, not in connection with any coal mine in operation. The deputy inspectors of mines may be put on the Board in lieu of mining engineers. The province, for the purpose of this

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section, shall be divided into three districts, called respectively Cumberland, Pictou, and Cape Breton Districts, and the Board, for the purpose of examination, shall be divided into divisions—one division for each district. Each division shall examine all candidates in its respective district. The papers of the candidates shall, for the purpose of examination, be referred to a general meeting of the Board, at which there must be present at least one member of the board from each district, and the successful candidate shall be recommended for certificates under this Act, or under Chapter 8, Revised Statutes, "Of the Regulation of Mines."

Schools of Instruction were carried on by the following instructors appointed by the Lieutenant-Governor-in-Council :

William B. Wilson, Springhill ; Jas. Maxwell, Westville, assisted by T. Blackwood.

Jno. George Rutherford—Stellarton.

A. D. McKenzie—Thorburn.

(On the death of Mr. McKenzie the work was carried on by Hy. McCarter.)

Jno. Carey—Sydney Mines.

Jno. Wier—Victoria Mines.

Jno. Johnson—Bridgeport.

Hugh Campbell—Old Bridgeport.

S. F. Lee—Glace Bay.

R. D. Anderson—Cow Bay.

The examinations were held on Sept. 30th, 1890, and the following certificates were granted :

#### UNDERGROUND MANAGERS.

W. D. Matthews—Springhill.

A. B. Wilson—"

Jos. W. Campbell—"

Andrew J. Scott—"

A. Babine—Maccan.

Jno. W. Sutherland—Westville.

Dan. Gillies—Stellarton.

Peter McMillan—Vale Colliery.

Angus McKay—Stellarton.

Alex. McEachren—Bridgeport.

Norman A. McKenzie—Sydney Mines.

Malcolm McDonald—Cow Bay.

David Brown—Sydney Mines.

Thos. Casey—Caledonia Mines.

Thos. Johnston—Bridgeport.

John Johnson—"

Dan Hardy—Caledonia Mines.

## OVERMEN.

Jno. Coleman—Joggins.  
 Thos. Hale—Westville.  
 E. S. Sutherland—Westville.  
 Neil A. Nickerson—Stellarton.  
 W. W. Gray—Westville.  
 W. A. Sutherland—Westville.  
 Joseph Quigley—“  
 David Paton—“  
 F. W. Crawford—“  
 John Johnson—“  
 Jas. Brown—Vale Colliery.  
 Andrew Link—Caledonia Mines.  
 Jno. O. Deady—Bridgeport.  
 Peter Currie—Low Point.  
 R. C. Handrahan—Bridgeport.  
 Henry Petrie—Low Point.  
 Angus R. McDonald—Low Point.  
 Simon Loft—Little Glace Bay.  
 David Wilson—Lorway Mines.  
 A'ex. McNeil—“  
 Jno. Fielding—Reserve Mines.  
 Jno. Egan—Sydney Mines.  
 Edward Rodgers—Reserve Mines.  
 W. S. Wilson—“  
 Angus McDonald, jr—Bridgeport.

The following certificates have also been granted :

R. H. Brown, Sydney Mines, service, manager.  
 R. Robertson, “ competency, manager.  
 R. Robson, Low Point, competency, manager.  
 D. Hayman, Westville, service, underground manager.  
 T. Fletcher, Reserve Mines, service, manager.  
 W. R. Wells, Stellarton, competency, manager.  
 Joseph Dakers, Stellarton, competency, underground manager.

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## GOLD.

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The total returns for the year 1890 show that 41,886 tons of quartz were crushed, yielding 24,358 ounces of gold for 160,264 days' labor, compared with 26,155 ounces of gold from 39,160 tons of quartz for 211,548 days' labor. It is to be regretted that there is a falling off in the yield of gold, and no very satisfactory explanation can be offered. It is stated that recently mines have been started on insufficient evidence of permanent values in the veins, and that this past season their producing capabilities have diminished. It will be noticed that more quartz has been crushed, and it is in this direction, that of low grade ore, that the future extension of gold mining in Nova Scotia must be sought for.

### SURVEYS—GOLD.

During the past season Mr. J. W. Wentzell made surveys at Rudolph's Brook and Millipsigate, in Lunenburg Co.

Mr. F. W. Christie was employed in connection with the Brookfield investigation, and disputed applications in Dartmouth.

Surveys were made at Gay's River by Mr. Jas. McKenzie and Mr. J. F. Anderson.

Mr. Samuel Smith made the necessary surveys at Fifteen Mile Brook, Whiteburn, Malaga, South Brookfield, and West Caledonia.

Mr. McCallum was employed at Rawdon, Ashdale, etc., and also on a survey in connection with some disputed coal area localities at North Sydney. Mr. Blois performed his usual surveys at Uniacke, etc., etc.

### HALIFAX COUNTY.

*Montagu.*—Operations have progressed quietly in this district during the past year; the quartz averaging about as high as in the year 1889. Returns were received from the Annand, Kaye, and Rose Mills. The largest yield was 362 ounces from 120 tons crushed in the Annand Mill.

*Carribou.*—The returns show 1560 ounces from 6591 tons against 1906 ounces from 7338 tons in 1889. Returns were received from

the Lakelode, Dixon, Touquay, Caffrey, and the Moose River Gold Mining Company Mills. The returns from the Dixon Mill show an average of over an ounce. Mr. Touquay crushed a large amount of surface ground, and dump stuff

*Waverley.*—The Lake View Mining Company, having completed their new mill, commenced crushing in the fall. It is expected that they will handle in this mill a large amount of quartz, as extensive blocks of ore ground have been won. A new company will operate the Gue and Wilson properties. A concentration and clorination plant has been put up here to treat ores, tailings, etc.

*Lake Catcha.*—The returns from this mine were good for the first part of the year, but there was little done during the fall.

*Fifteen Mile Stream.*—The operations of the New Egerton Company, under Mr. Jas. A. Fraser, have been successfully carried on during the past year. The Stanley Company also worked steadily. The returns show 3017 tons crushed, yielding 2305 ounces, compared with 786 ounces from 1416 tons in 1889.

*Salmon River.*—The approaching completion of the new and powerful mill at this mine will enable an increased output to be maintained next year. The returns show 6415 tons crushed, and a yield of 2070 ounces, averaging 6 dwts., 10 grns., against 7633 tons and 2032 ounces during the year 1889. The uniformity of the yield of large amounts of quartz in this mine is worthy of notice. Up to date this mine has yielded 35,270 ounces from 79,456, tons of quartz.

At Killag crushing has commenced, the December returns of the Killag Company being 51 ounces from 45 tons. At other points in Halifax County there is little new to report.

The Western Gold Mines were visited by Mr. Madden, Deputy Inspector, who reports that they are worked with proper regard to the safety of the men employed. I append a memo. of his visits:

The returns show—

	Tons.	Ozs.	Dwt.	Grs.
Brookfield .. . . . . .	2500	1643	5	0
Malaga . . . . .	6198	3809	18	12
Whiteburn . . . . .	960	840	0	0

## GUYSBORO' COUNTY.

During the past season little has been done at Goldenville and Wine Harbor. At Stormont litigation has impeded mining, and the returns show a falling off. It is anticipated that this difficulty will be surmounted shortly, and it is to be hoped this district, one of the

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most promising in the Province, will be worked to a greater extent than it has for several years.

*Oldham.*—The returns show 2774 ounces from 1122 tons, compared with 2709 ounces from 1391 tons in 1889—the returns being from the Oldham Gold Mining Company. A noticeable yield was from June 23rd to June 30th, when 30 tons 8 cwt. yielded 875½ ounces. A new mill is being built by this Company, and additions are being made by the Standard Company to their plant.

*Rawdon.*—At the close of the year the returns showed 1899 ounces from 1892 tons of quartz, etc. A large amount of prospecting has been done in this locality, and at the end of the season it was anticipated that several valuable leads would be opened in the spring. Several lots of surface ground and slate were crushed by the Central Rawdon and the Gould-Northup mill, and yielded well. It is believed by some authorities that the surface is rich enough to be systematically treated.

*Renfrew.*—Work has not been very successful in this district during the year 1890, the returns amounting to only 253 ounces. The Empress Gold Mining Company have restored their plant injured by fire last summer. Work on the free claim was to be closed at the end of the year.

*Uniacke.*—The principal returns were from South Uniacke, The Withrows continued working, and the new shaft on the Thompson property was sunk, striking the pay ground, which proved to be richer than to the westward.

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*Memo. of visits paid by Mr. Madden, Deputy Inspector, to the Queen's County Mines:*

*Brookfield Mine.*—Sept. 23. W. C. Gray, Manager. Thirty-eight men to work. This mine is in excellent order.

*Malaga Mine.*—G. A. Ward, Manager, John Thorman, Underground Manager. North Lead working west; Rabbit Lead is also being worked. The Chester Lead and Mill Lead are idle under repairs. The management is sinking No. 4, west shaft, and when down about 90 feet more, will crosscut the other leads, and will then have two years work opened in advance. The Nugget and Boulder workings are under repairs.

*Boston Mining Company.*—F. K. Ballou, Manager, J. F. McBain, Underground Manager. About fifty men employed here erecting buildings and machinery. This mine has heretofore not been furnished with pump or engine, but having now obtained them, expect shortly to utilise them to advantage. The mine is in good order.



*Caledonia Mine.*—Charles McLeod, Manager. 36 men employed. This year have erected a 10 stamp mill. The engine being connected with the bank head of 5 or 6 shafts by a steel wire rope, and a cog-and-pinion-wheel at each bank head, connected with hoisting gear, are enabled to hoist or lower from each shaft independently of the other. A diamond drill is at work boring south at a point 100 feet down the shaft testing the property. Two compressed drills, capable of boring 4' in 20 minutes, are at work in this mine; they have sufficient power to start three or four more.

*Parker Douglas Mine.*—Rod'k McLeod, Manager. Forty men employed. Seven compressed drills to work. Hoisting engine same system as Caledonia. Six new hoists during the year. New machinery—boilers, 200 h. p.; boiler, 75 h. p., running the drills; a new rotary pump; fifteen new stamp, making 20 in all; new boiler shed; new compress house, 45'x32'; also a large addition to the mine house; new concentrators.

This Company has prospected 30 leads bearing gold. They have sunk 160' in one shaft and cross-cut several other leads; laid railroads on their lead and cross-cuts. The quartz is dropped down shoots into boxes, then taken to main shaft, where the boxes are hoisted and then dumped into shoots carrying the quartz to the mill. This is probably the best equipped mine in the Province, and it is in good order.

*Newton Mine.*—Queen's Mining Company. J. C. Putnam, Manager; C. W. Crowe, Underground Manager. Bu-y erecting new machinery, the buildings for which are nearly completed.

*West Mine*, so-called.—G. C. Smart, Underground Manager. 60 men employed, chiefly engaged building. Also adding some new machinery.

*Royal Gold Mining Company* for want of machinery are not doing very much, but have the necessary plant on the ground, and are hard at work getting into working shape.

I may, in conclusion, say the mines are all being thoroughly repaired, and additions in the shape of the most modern machinery and appliances are being made to the plant.

I remain, yours truly,

W. MADDEN, JR.

WESTVILLE, PICTOU Co.

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### REMARKS.

During the past year much attention has been given to non-flaming explosives, and at the Intercolonial Colliery, Mr. Fergie, manager, has successfully used Roburite. A company has been formed to manufacture this explosive within the Province; and would appear to have a promising future before it. The literature in this class of explosives is already very voluminous, and the most important addition is that contributed by the North of England Institute of Mining Engineers, who have translated the French Commission's Report on the Use of Explosives in the Presence of Fire Damp in Mines. The report gives a synopsis of the work of the English, German, and Austrian Commissions, and the following are the conclusions arrived at:

1. Blasting-powder, even fired in the midst of water, can ignite mixtures of fire damp and air.

2. Most of the known explosives, detonating unconfined, are liable to ignite fire damp mixtures; dynamite, military or mining gun-cotton, particularly the latter, blasting-gelatine, gelatine-dynamite, and ammonia-dynamite of Paulilles, are in this category.

3. It is possible, however, to find explosives which detonate at a temperature low enough not to provoke, at least in the great majority of instances, detonating unconfined, the ignition of fire damp mixtures. Among the explosives tested by the commission which realize these conditions, more or less perfectly, may be mentioned:

(1) Intimate mixtures of 50 per cent. of dynamite with 50 per cent. of crystallized carbonate of soda; sulphate of soda with 10 equivalents of water; ammonia-alum; or sal-ammoniac.

(2) The proxyline powder from Moulin-Blanc.

(3) The mixture of 20 per cent. of dynamite, (75 per cent) with 80 per cent. of nitrate of ammonia.

(4) The mixture of 20 per cent. of gun cotton (= .68 cubic inch of  $\text{NO}_2$  per grain) and 80 per cent. of nitrate of ammonia.

(5) Bellite, the composition of which is not known with perfect certainty, and which, as yet, has undergone an insufficient number of tests.

(6) Favier explosive, made of about 90 per cent. of nitrate of ammonia, and 10 per cent. of mononitro-napthalene, which appears likely to equal bellite as regards safety, but whose intermediate detonator, such as has been submitted to the Explosive Substances Commission, should be suppressed, and upon which further experiments should be made.

4. By reason of the complexity and the lack of certainty of the phenomena which may attend the detonation of unconfined explosives it will always be prudent to avoid firing shots (even charged with one of the explosives considered the safest) at a point where the mixture of fire damp and air may be inflammable. The choice of these explosives should be considered as considerably lessening the danger of explosion; it should not be considered as absolutely suppressing it.

5. Explosives must always be used under the conditions which allow them to develop the maximum of useful work. Both economy and safety agree in the recommendation of this rule.

Consequently, the explosive must be carefully stemmed at the bottom of the shot-hole, which must be deep enough; the leaving of an empty space either in front or behind the cartridge, or on one side must be avoided; contact must be avoided between the explosive and the Bickford fuse, if the detonator is fired by that means, the danger of which is besides serious enough to make it desirable to replace it by a safer means of firing.

The commission had not to consider matters of management. It may be seen, however, that the preceding conclusions tend to the abandonment of blasting powder in fiery mines, and even to throw suspicion on ordinary dynamite, blasting-gelatine, and ammonia-dynamite, as now manufactured, blasting-gelatine appearing to be the most dangerous of all these substances.

The explosives which can best be recommended as regards safety, are dual mixtures of an explosive such as dynamite, gun-cotton, or dinitro-benzol, with nitrate of ammonia. The mode of manufacturing these mixtures, the manner in which they can be protected from atmospheric moisture, and the greater or less duration of their resistance to this influence, ought to be tested. It will also be necessary to test the useful effect of these mixtures in practical experiments, the manner in which they act in breaking down stone, and more particularly coal. The study of these questions will require experiments, most of which can only be made at the mine, and by the managers.

A paper by W. M. Shore, read before the same society, contains many interesting details about spontaneously ignited pit fires. Petroleum engines have been tried underground with some degree of success. They are objectionable on account of the readily ignitable character of the fuel, and on account of gas, (although this can be guarded against by gauges), but are in other respects cheap and reliable. A method of bailing water in shaft sinkings, introduced by Mr. Galloway, is worth notice. The pneumatic barrel, when it reaches the bottom of the shaft, is attached by an instantaneous coupling to a pipe which passes down the shaft, from an ordinary air pump condenser constantly working on the surface. The water is then sucked into the barrel by means of a flexible hose, the height of the water being noted by a glass water gauge. By this means a sinking was taken down, when 5,000 gallons of water per hour were met. In slopes bailing with a tank from a sump, an arrangement of this kind would prove very convenient.

Elliot's lubricator is also well spoken of by Mr. E. Bainbridge, in an address to the Institute of Mechanical Engineers. This consists of a pedestal cap of sheet steel enclosing each axle bearing, and a layer of felt within it absorbs enough oil at one application to last from one to three months, if the roads are dry. The axles by this arrangement are less worn in wet or dusty roads, because the cover to some extent keeps off the wet, and excludes the dust. A trial under the conditions of ordinary use showed that with one application a car could run 300

miles. The use of counter or back balances, which have been in use here for many years, is spoken of by him as a recent improvement in Staffordshire. He refers to the case of a colliery in England, where there are now steel pit girders in use valued at \$25,000. The advantages of steel over timbers are, (1) Extra durability, and thus reduction in cost of repairs. (2) The girders can be used again and again, as when bent they can be rolled again. (3) They are light and handy, the weight of a 10 ft. steel girder, as used at the Nunnery Colliery, being 166 pounds, while a boom of spruce of equivalent strength, would weigh about 300 lbs. (4) The increased space for air currents, owing to the smaller size of the steel girders. At the Springhill Colliery, Mr. Swift, the manager, has utilised a large number of old rails for support to the roof of the main inlets from the fans. And Mr. Poole has used iron booms at several points in his levels at the Acadia Colliery. Mr. Andre referred to this subject as follows:

The use of iron supports for the timbering formerly universally employed in the underground road of coal-mines is constantly growing. It is not surprising that iron should be made to displace wood in such situations. Weight for weight, it is stronger than wood, and more durable. Moreover, it occupies less space than the latter, a matter of considerable importance in some situations—in all situations, indeed, since it allows the minimum of excavation. Iron being, all things considered, cheaper than wood, there is a double advantage in adopting it in the underground workings, inasmuch as the iron-making and the coal-mining industries are mutually dependent. To produce a ton of finished iron or steel, about two tons of coal have to be burned.

Though not the first to propose it, the Germans were the first practically to adopt the system of iron "timbering." In 1887 there were in the Prussian State mines, according to statistics then collected, 27,709 iron "sets" in the roads. Since then their number has greatly increased. Outside the State mines, the system is making constant headway, so that at the present time many thousand tons of iron are in use for this purpose. The two or three German firms who have laid themselves out for this work have done and are doing good business.

The German system has been adopted in France—namely, that of vertical "uprights," with semi-circular "cap" or "head-piece." At the Liévin Collieries alone, there are now some ten thousand of such "sets." Perhaps the company which has the most carefully studied the question, is that of Meurchin, in the north of France. A system there in use is remarkable for its originality. It consists essentially of two joists of the double T section, curved towards the top, where they are connected by a stout bolt. This gives an ogival or "Gothic arch" form to the set. This system gives a minimum section to the excavation, and it is cheap; but it is not applicable everywhere. It is wanting in stability at the base, and the bolt is apt to give way. In the Saint-Etienne basin the circular and the elliptical forms are commonly adopted, the ground being of such a character that strong lateral pressures have to be resisted.

The French have learned from the Germans, too, in the matter of pit-head frames. A new construction of this nature at the Tonquin

pit of the Dourges Collieries is of the Westphalian type. The vertical latticed portion, which carries the guides, is strutted by tubes of 18 inch diameter. The pulleys are 54 feet above the bank floor, which is 25 feet above the mouth of the shaft. The framing has been calculated to bear a strain of 12 tons on each drawing rope—that is, for use with a three-decker cage, carrying six tubs and drawing from a depth of 520 yards. The total weight of this structure is only 15 tons, so that it is the lightest of that type existing on the Continent. It is, however, perfectly rigid, no perceptible displacement of the top being observable while winding is in progress. The cost was moderate, amounting to only £15 per ton finished.

On the subject of fans Mr. Bainbridge remarks:—

*Fans.*—The considerations to be aimed at in selecting a mechanical ventilator are as follows:—First cost of fan, engine and foundation; future cost of maintenance; economy of fuel and stores; useful effect of fan. Several committees of mining engineers have been formed to report upon the relative merits of various machines; and as at the present time a series of exhaustive experiments is being made by a committee of the Northern Institute of Engineers, it may be sufficient if in this paper the writer simply refers to some of the chief types of ventilating fans in operation in this country, at the same time giving particulars of a case in which each separate fan is now adopted. These fans are the Guibal fan, Walker's improved Guibal fan, Cockson's, Schiele's, Capell's, Waddell's and Lupton's fans.

The Guibal fan is that most largely adopted, and is so well known that it needs no description. In Walker's improved Guibal fan the chief variation in the style is the increased strength, designed with the view of obtaining the same results with a small diameter of fan; and the air, instead of being admitted, as in the Guibal fan, on one side only, is admitted on both sides. The Guibal movable shutter is replaced by an anti-vibrating shutter, which is very effective in its action. The tendency recently has been to adopt fast-running fans, which, however, are most suitable where limited quantities of air are required. Four years ago the writer adopted this principle at the Woodthorpe Colliery, near Sheffield, by applying an 8 foot Cockson fan, driven direct without gear by one of Willans and Robinson's direct-acting engines, which runs very quietly at a speed of 280 revolutions per minute. At this speed the fan gives about 58,000 cubic feet of air per minute, with 3 inch water-gauge. The engine since it was started has run about 500 million revolutions, and has cost a very small amount for repairs. The actual economy in the useful effect of a fan depends upon the cost of fuel; but bearing in mind that the useful effect is found to vary from about 15 per cent. to 70 per cent., the matter is of importance; and in the ordinary carrying on of a colliery, the quantity of fuel used in driving a fan-engine, which practically never stops working, may be said to be one-fourth of the entire fuel used. A simple contrivance in connection with ventilating machines, which the writer is adopting at the Nunnery Colliery, may here be mentioned. A new engine-house which is now being completed, will be ventilated by taking a pipe from the roof, and passing it into the fan chamber; the air leaving the house will pass up through two ventilators placed in the roof, and thence to the fan.



He remarks on coal cutting machinery :—

Very little progress has been made during the last twenty years in the replacement of manual labor by machinery for the getting or hewing of coal. It was thought at first that such machinery would be economical only in the case of coal seams which were both hard and thin; but experience has shown that the only two conditions which are imperative are a fairly strong coal and a good roof. Without going into details as to the merits of various systems, it may be sufficient to mention that a colliery in South Yorkshire, with which the writer is connected, about 700 tons of coal per day are worked by a rotary machine, the design of which has been arrived at as the result of many years' experience. The first cost of a coal-cutting plant, including air-compressor, pipes, and coal-cutting machine to cut about 300 tons per day, is about £3,500. There is a distinct saving of labour in the use of the machine, but this has not as yet been advantageous to the coal-owner; the chief advantages are that a larger quantity of round coal is produced, and the most arduous and therefore the most expensive part of a collier's work is done by machinery.

This may be compared with the statement that in Illinois in the year 1888, nearly 20 per cent of the coal produced was mined by machines operated by only 10 per cent of the men employed in the mines. Altogether 272 coal cutting machines were used, viz.: 245 Harrison, 17 Legg and 10 Lock.

### COAL DUST.

The following minute of the Right Honourable Henry Matthews, Her Majesty's Principal Secretary of State for the Home Department, has been issued to Her Majesty's Inspectors of Coal Mines :—

My attention has for some time been directed to the effect which the presence of coal dust in mines may have in originating or in propagating explosions. Two disastrous explosions have occurred in the course of the present year, at the Llanerch Colliery and the Morfa Colliery, which has given fresh prominence and importance to this question. Both of these explosions were made the subject of careful investigation by competent men; but although various theories were advanced in order to account for the origin and course of these terrible disasters by the presence of gas, those theories were not by any means conclusive, and there were many circumstances which led to the inference that one or both of the explosions were extended and assisted, if they were not caused, by coal dust. The same inference arises from a study of the explosions at the Mossfield Colliery and the Hyde Colliery in 1889; and from some earlier explosions, such as those which occurred at the Elemore Colliery in Durham, and Altofts Colliery in Yorkshire, and the St. Helen's Colliery in Cumberland. As I felt the great importance of arriving at further information and more certain conclusions on this subject, I sanctioned the proposal of Mr. Hall, Her Majesty's Inspectors of Mines, to conduct experiments for the purpose of ascertaining whether an explosion can be caused

by blasting operations when coal dust is present, and in the entire absence of gas or fire damp. Mr. Hall has the merit of having been one of the first to draw attention to this subject. He, as well as Mr. Galloway, whose opinions are well known and have been often published, brought the matter prominently before the Royal Commission appointed in 1876 to report on accidents in mines, before whom, however, these opinions only met with partial acceptance. The subject has also been specially investigated in the Durham district by Mr. J. B. Atkinson and Mr. W. N. Atkinson, Her Majesty's Inspectors of Mines. The result of Mr. Hall's experiments is reported by him in a paper which accompanies this circular, and to which I desire to call most serious attention. The conclusion deduced by Mr. Hall from his experiments is that a blown-out shot may, in the presence of coal dust, and in the entire absence of fire damp, cause explosions of great violence, often accompanied by volumes of rushing flame, travelling considerable distances, and possibly so far as the supply of coal dust continues. These experiments do not by any means exhaust the field of enquiry, which I propose to pursue with the best scientific assistance I can obtain. But I consider it to be my duty to lose no time in bringing before colliery owners, agents and managers the results already obtained, and the serious dangers to which the presence of dry coal dust in mines may not improbably give rise. The provisions in the Coal Mines Regulation Act, 1887, with respect to shot-firing in dry and dusty places, should, of course, be rigidly observed. But I am of opinion that prudence requires more than those provisions enact. I strongly urge upon colliery managers that in all mines of at all a dry and dusty character the accumulation of dry coal dust should be prevented by removing the dust and watering work-places and road-ways (roof and sides as well as floor), and further, that shot-firing with gunpowder should only take place when all the workmen have been withdrawn from the seam. I do not think that fresh legislation can usefully be attempted until the subject, both of the danger which coal dust may cause, and of the means by which that danger can best be met, has been thoroughly investigated by competent scientific men. I shall lose no time in instituting an investigation of that character; but, in the meanwhile, I urge upon colliery owners, agents, and managers to adopt the best means at present known for preventing, or at least mitigating, such disasters as have recently occurred.

HENRY MATTHEWS.

WHITEHALL, *December, 1890.*

Doctor Hasslacker gives the following summary of the principal results of the Neunkirchen experiments:—

1. With ordinary air all coal dusts are absolutely without danger in presence of a naked light. This harmlessness still remains, even with 4 per cent of  $\text{CH}_4$  in the atmosphere, although if the coal dust be raised in clouds a considerable elongation of the flame is perceptible. With more than 4.5 per cent of  $\text{CH}_4$ , and with certain sorts of dust, the presence of a naked light causes an explosion; and with 5 per cent of  $\text{CH}_4$  the explosions are incomparably more violent than with 6 per cent of  $\text{CH}_4$  without dust.

2. In an atmosphere free from gas, the firing of a gun, charged with ordinary gunpowder (230 grammes) and with a tamping of clay produced a length of flame from 3 to 4 m.; with a tamping of a mixture of rock and coal dust the flame increased to 5 m. in length, and with a tamping exclusively of coal dust from 9.50 m. to 16 m., according to the quantity of coal used. The nature of the coal dust appeared to have but little influence on the length of the flame.

3. The presence of coal dust within the radius of an explosion greatly increases the force of it and with certain sorts of dust an explosion may result even in the absence of fire damp. The coal dust found in closest proximity to the flame showed particles of coke on its surface, and sometimes cakes of coke, whilst the amount of volatile gases in the coal dust was greatly diminished. The degree of fineness of the chemical composition of the coal make themselves felt in a remarkable manner, and during the experiments it was found that (a) coals containing less than 10 per cent of volatile matter are almost entirely free from danger, and elongate the flame but a very few metres; (b) coals consuming from 10 to 16 per cent of volatile matter elongate the flame to 25 metres and perhaps further; (c) smith coal, containing from 16 to 24 per cent of volatile matter, resulted in a flame, which in a gallery, extended as far as the coal dust had been scattered, and caused an explosion, provided the dust contained a sufficient amount of gas; (d) gas coal, containing from 24 to 32 per cent of volatile matter, yielded a less length of flame; but which, however, extended as far as the dust, if the dust was sufficiently fine; (e) gas coal, with more than 32 per cent of volatile matter, causes elongations of the flame only 20 metres in length, except in the use of artificially fine dust, when the flame then extended as far as the dust.

These results consequently refute the opinion that has hitherto been generally held—that only coals containing at least 30 per cent of volatile matter could furnish inflammable dusts, and that the inflammability was in proportion to the amount of volatile matter. These experiments also prove that a much smaller quantity of dust than Messrs. Galloway, Mallard and Le Châtelier supposed necessary, will cause serious danger. Prior to these experiments being undertaken, it was thought that in order to cause an explosion there must be 1 kilo. of coal dust to a cubic metre of air.

4. In reality, there are but few coal dusts (those of the Pluto and New Iserlohn mines excepted) which are dangerous of themselves; it is when there is a certain proportion of fire damp present, even 2 to 3 per cent, that the great majority of coal dust become imminently dangerous.

5. Coal dust is not inflamed in an atmosphere free from gas, but if the atmosphere contain from 5 to 6 per cent of fire damp, combustion takes place.

6. The action of violent explosives on coal dusts and fire damp is much less than that of ordinary gunpowder.

7. Coal dust may be fired when blasting the mine, as well as by an explosion of fire damp.



8. In damping coal dust, the danger of inflammation is not entirely removed unless the latter is damped by a weight of water equal to about half its own weight. These results have been confirmed most evidently by the experiments made at Chatham in 1882 and 1883 by the English Commission on Accidents in Mines, also by the results obtained quite recently (1885) by the Mines Department of Saxony in the experiments made at the Brückenbergr shaft, No. 1 (Zwickau), where about 100 sorts of coal dust were experimented upon.

The following remarks made at a recent meeting of the North Staffordshire Institute of Mining and Mechanical Engineers, on coal dust, are of interest:

Mr. H. R. Makepeace, Assistant Inspector of Mines, said it was admitted by all that the presence of fine coal dust in the roadways and working places of a mine was a real source of danger, and it was with regard to the means of mitigating the danger that he intended to confine his remarks. The reality of this danger was brought before the mining population of North Staffordshire eighteen months ago by the disastrous explosion at Mossfield Colliery, when sixty-four persons lost their lives; the extension of the explosion into the Banbury seam, and the consequent death of thirty-seven persons there, being entirely attributable to the presence of coal-dust. Other explosions in different parts of this and other countries could only be explained by being attributed to the same cause. In the working of all seams coal dust was present in greater or less quantities, and where the seams were dry, and, like all the lower seams in this coal field, made a large quantity of fine dust in their working while giving off fire damp freely, we had at any time all the necessary elements for an explosion, only wanting the means of ignition. If we could remove the dust or render it harmless, then we should lessen the danger enormously. To remove the dust so completely as would be necessary to prevent it from being an active agent in carrying on the force of an explosion, would be very difficult if not practically impossible, so that that means of dealing with the dust might be left out of consideration. Sprinkling the roadways with common salt has been advocated, but then there was the difficulty of treating the fine dust lodged on the timbers and against projections from the roof and side of the roads, where the most dangerous accumulations of dust were generally formed. When sprinkled on the floor of a roadway, salt moistened the surface of the dust, but this soon formed into a hard cake which became broken up by the traffic on the road even into finer dust than it was at first. This could be remedied by again sprinkling with salt; but the difficulty with the dust elsewhere than on the floor could not be easily met. Water was the natural element for laying dust, and it was to water in some form that we must look for the best method of rendering the dust harmless. The first form of water tub for watering the roadways under ground, familiar to all, allowed a stream of water to flow into the centre of the road, completely saturating that part and converting the dust into mud, but leaving the remainder of the road in its original state. An advance upon this form was to fix a perforated pipe round the sides and end of the tub after the manner of a street watering cart; but the effect of this was very little better

than the previous arrangement, and neither of them moistened the dust lodged on the timbers and on the sides of the road. He described the sprayer patented in 1887 by Messrs. Robson and Archer of Gateshead, and also referred to a tub designed by Mr. Ramsay for the same purpose. These he (Mr. Makepeace) said were only in action when travelling, which was an objection to this method of laying dust. An entirely different way of dealing with the dust had been adopted in the South Wales coal field, especially in the stream coal collieries, where, owing to the exceptionally dry and dusty nature of the coal worked, and which gave off fire damp very freely, the question of laying the dust had received more attention than in any other mining district. The system generally in use there was to convey water under pressure along all the main roads, allowing it to escape into the air-current in the form of spray through jets fixed to stand pipes from the main water pipe. The system was easily applied; it was automatic in its action, could be continued for any length of time, and the watering was done in the most efficient manner, while causing the least possible harm to the roof and floor of the mine, at the same time materially adding to the comfort of the workmen and others engaged in the colliery, by reducing the temperature of the air-current traversing the working faces. At one colliery in South Wales with which he was acquainted—the deepest, he believed, in that coal field—the temperature of the air-current in the working faces was reduced by 7 degrees after introducing watering by jets in the intake air roads, this system having advantages over any other method of watering roadways yet introduced. A very great improvement in this system has been effected by Mr. Wm. Martin, of the Dowlais Collieries, by combining compressed air with the water, and carrying a double line of pipes along the roads. He, Mr. Makepeace, observed that at a previous meeting when the coal dust question was discussed, objection was taken to watering by some members owing to the fear that water would cause the roof of the gob roads to break down and the pavement to heave up. Where the watering was done by pipes and sprays, in either of the methods he had described, this was not found to be the case, although in South Wales, where either one or other of the systems was applied at almost every colliery, the roads were all cob roads, and the floor was very much subject to heaving. He could call to remembrance one roadway, a piece of return air-road, where a thickness of 20 feet of bottom was out up in the course of eighteen months, and this road was perfectly dry. Very little trouble with the pipes arose from this cause so long as the sprays were kept working properly, and the water issuing from the jets only in the form of fine spray or mist like a jet of steam. When this was so no pools of water were ever seen standing on the roads; nor were there any decidedly wet or muddy places; one great object of the spray being to avoid this. He did not think the system was quite perfect, but he did think it the best that was in use.

Mr. J. G. Bakewell said the Home Secretary suggested the removal of the dust, but that hardly seemed to meet the difficulty, as we did not know how often it must be removed, or what quantity it might be safe to allow to accumulate. The radical cure, if possible, would

be to prevent its formation. A suggestion had been made that perhaps this might be done by charging the air travelling through the workings with moisture, and with this view he had made some experiments at Mossfield Colliery. Steam had been turned into the air going down the downcast shaft. The exhaust steam from the fan engine had been used, because the fan was constantly working, and a valve had been put in the pipes so that the quantity of steam could be regulated. It had been found that only a small quantity could be used or the mist become so thick that it was impossible to see in the pit, but with this small quantity almost complete saturation was obtained at the pit bottom, the difference between the wet and dry bulb of the hygrometer being only about half a degree. The temperature at the pit bottom had not been much raised, certainly not during this winter to the temperature of the mine. The damage to the roof and sides had not been great so far. The experiment had been going on for a little over two months, and the dust on the floor for the first 230 yards had changed very considerably. Before it was very light, and would rise at every step; now it was dark, heavy and damp. It was not so damp that it set and made a solid floor, but it would not readily rise, and when a handful was thrown up it quickly fell to the ground. The dust on the timber and sides also, when pressed between the fingers caked slightly. The timber also showed evident signs of damp. Further in the workings the dust got drier, until at about 400 to 500 yards hardly any difference seemed perceptible from what it was before. In one respect the experiment had failed. It had not prevented the dust rising from the tubs as they travelled along, and therefore it had not prevented the formation of the dust even within a few yards of the pit bottom, but the dust so formed evidently soon became damp. Considering the small quantity of steam used, the effect had been considerable, and it had been more perceptible the last week or two. There was a further experiment he hoped to try. It was to turn on the whole of the steam at the weak end, when no one was at work, until, if possible, the whole workings were filled with heavy mist. If this could be done some time at the week end, and continued even for only twelve or twenty-four hours, he thought it would have a very great effect, but at the same time he was afraid it would have a disastrous effect on the roof and sides. On Sunday the experiment was tried for eleven hours. Only half the steam of the fan engine was turned on. The steam in the place was very perceptible, and had evidently gone to the workings. There was a decided effect produced, but in the Hard Mine seam it brought down the roof of the intake air course a few yards. That was the danger. On the whole he was not very sanguine as to the success of using steam; or rather he thought there was a simpler and more effective plan, and one which would not involve any ill effect to the roof and sides. The danger was the dust arising from the tubs travelling along the roadways. Suppose the coal was thoroughly wet, say at the bottom of the drift jigs, no dust could then arise from the shaking of the coal, and the drippings from the tubs would effectually damp the floor of the roadways and prevent any dust arising from that source.

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Mr. E. B. Wain said he had conducted some experiments extending over twenty-two days on the Whitfield Colliery, with reference to the deposit of "upper" dust. He detailed the circumstances connected with the experiments, and the result arrived at, which he said pointed to the conclusion that two-thirds of the upper dust deposited on the timber, even on a road where the trains of coal were hauled at a moderate speed, and against an average air-current on a main intake, was blown from the loaded wagons in transit, and that the deposit was largely increased where there was much traffic by men and horses. It was evident that although the deposit of upper dust contained the finest particles, and was consequently the most highly inflammable, the floor dust was an equally fruitful source of danger, especially in roads where there was much traffic; and in any case should be thoroughly dealt with. It would almost appear that the only really effective way of dealing with the upper dust blown from the tubs in transit was to go to the root of the matter and moisten the top of every load of coal before it left the working-face, or at least at some main point before bringing it on the main haulage road. Only a small quantity of water would be needed on the top of each load to keep down the dust, and the drippings from the tubs would be sufficient to keep down the floor dust. In extreme cases it might be necessary even to damp the face of the coal. He had experimented with roburite and had been unable to ignite cold dust with it.

I reprint here the special rules in force at a Pictou colliery over fifty years ago, as of interest in showing that then, as now, the use of powder was intimately connected with fires:—

#### INSTRUCTIONS.

*Rule 1.*—The overman, and at least one of his deputies or assistants, shall examine all the boards and other working places, every morning, before the colliers go down. They shall meet the colliers and other workmen at the bottom of the shaft, and if they have found any gas or other cause of danger in any of the boards, shall caution the colliers belonging to such boards, and give them such instructions as they deem necessary.

*Rule 2.*—Whilst the pit is at work, an overman or deputy shall always be present at each face of the works,—namely, one on the north and one on the south side, so that in case of an alarm of fire or any other accident, the overman or deputy shall always be at hand or within call.

*Rule 3.*—When the day's work is finished, the overman or his deputies shall remain in the mines, for the purpose of going through every board, and carefully examining them after the colliers have left, so that no blower or gas may be left burning, or any fire concealed amongst the fallen coal.

*Rule 4.*—Every board shall be furnished with a fire bucket, marked with the number of the board, a coarse bag for beating out gas, and a tub or open-headed cask, to contain 40 or 50 gallons of water. The fire bucket and the bag shall be in charge of the colliers of each board, who shall pay for or replace them if lost.

*Rule 5.*—Every Pannel, consisting of six boards, shall be furnished with a small cannon, which shall be kept at some convenient spot in the lowest board. The overman and deputies shall keep the cannon clean and dry and ready for use. They shall also keep the tubs constantly full of water in each board.

*Rule 6.*—Every board shall at all time be furnished with a safety lamp, which shall be examined by the overman at last twice a week, and in case of any injury being done thereto, more than common wear, the cost of the lamp shall be charged to the colliers, in whose care it is placed.

*Rule 7.*—Any collier meeting with a cutter or fissure which yields gas, or with any thing unusual, in his board, shall immediately report the same to the overman or deputy.

*Rule 8.*—No collier shall be allowed to put in more than one shot or blast at a time, into any bench or fall, without permission from the overman.

*Rule 9.*—After blasting either a fall or bench, the coal shall be turned back, so that no fire may be concealed amongst the loose coal; and before the colliers leave their boards, they shall be careful that no blowers or gas are left burning.

*Rule 10.*—No collier shall work in any fiery board, unless there are other colliers working in the adjoining boards at the same time.

*Rule 11.*—The coal shall not be blasted, or a naked light used, on any pretence whatever, in any board or working place, in which the overman has forbidden gunpowder or naked lights to be used.

*Rule 12.*—Every person employed in the pits, on passing through any air-door or trap-door, shall always close it after him.

*Rule 13.*—No person shall unscrew his safety lamp (where such are used) excepting when and where he is ordered or directed to do so by the overman or his deputy.

*Rule 14.*—When a blower or body of gas is fired by a shot or otherwise, which cannot be at once extinguished by the ordinary means, notice shall be sent without delay to the overman or deputy; and in the meantime the colliers from the adjoining boards shall be called in to give assistance.

*Rule 15.*—On the arrival of an overman or deputy at the fire, all the colliers and other persons who may be present, or sent for, shall act under his orders, and use every exertion to carry them into effect.

*Rule 16.*—The extinguishing engine shall be kept in a proper house, near the pit top, and a bell of not less than 28 lbs weight, shall be hung upon the pit frames, at No. 1 shaft, with a rope leading to the bottom of the shaft, for the purpose of making signals from below, without loss of time.

*Rule 17.*—The overman or deputy, on his arrival at a fire, shall, if he considers it necessary, cause the bell to be rung for the extinguishing engine, and to give notice to the manager, or deputies, or other



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persons who may be on the surface, whose duty it is to be present, that they may immediately go down.

*Rule 18.*—In all cases of fire a most determined effort must be made with the extinguishing engine; beyond this it is impossible to frame any rules that will apply generally. The manager and his assistants must then decide what further measures to adopt.

*Rule 19.*—The overman or the deputies, who shall have gone through all the boards after the workmen have left the mine, shall report personally to the manager, the general state of the works, and particularly whether the cannon, buckets, water tubs, &c., are all in readiness for any emergency; and in case the manager shall be absent, they shall enter their report in writing in a book kept in the office for that purpose.

*Rule 20.*—No deputy shall at any time whilst on duty in the pits, during working hours, leave his appointed station until relieved by another deputy, to whom he shall report the state of the works under his charge, together with any instructions he may have received from the overman.

*Rule 21.*—At all times, whether there is any apparent danger or not, the foregoing rules shall be strictly adhered to, without the slightest relaxation, their object being to protect the lives of the workmen, as well as the works themselves; and any person neglecting, or in any way evading them, shall, if the manager thinks proper, be dismissed from the service.

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## COPPER.

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I have little new to report under this head. Some attention has been given to the copper ores of Brierly Brook and Pinkietown, Antigonish County, and a lease has been taken at the former place by Mr. John Grant.

A good deal of work was performed at the Coxheath Mines, Cape Breton County, and but for the general financial depression systematic works would have been started last fall. The No. 2 shaft was sunk to the 250 feet level, and a cross cut was driven 134 feet to the north cutting the main, or B. vein, which was found to be 32 feet wide, and to yield a considerable proportion of smelting ore assaying from 10 p. c. to 20 p. c. copper, with a little silver and gold. On the new vein lying south of the present workings a shaft has been sunk 50 feet in paying ore, and on the surface it has been traced 1,000 feet. No. 1 shaft was unwatered and repaired, and the drill plant prepared so that a drift would be run into vein B, lying a short distance to the south. The additional drills and compressors alluded to in a previous report have been added to the plant, giving it a strength of ten drills,

with two in reserve; and some 3000 feet of piping has been laid to connect shafts 1 and 3 with the plant at shaft No. 2. On the Argyle area the westward extension of the veins has been further tested, and a point has been selected for a new shaft.

Mr. J. P. Gragg makes the following return of labor performed during the year 1890.

Skilled labor, overground .....	1717	days.
Unskilled " " .....	3380	"
Skilled labor, underground .....	1785	"
Unskilled " " .....	1598	"
Teams and Drivers .....	323	"
Coal teams .....	360	"

About 1000 tons of ore were extracted and banked.

## IRON MINING.

Operations have been steadily pursued by the Londonderry Iron Company, both at their mines and their furnaces. Calcining furnaces have been built, and large amounts of Spathic ore have been burned. This process greatly increases the per centage of iron in the ore, and makes it more fusible.

The New Glasgow Iron, Coal and Railway Company have commenced a branch line from Eureka to connect with their furnace at the forks of the East River, and with their mines at Springville. They have continued opening and testing their large and valuable properties.

Iron ore was mined by this Company at Brookfield. Mr. Leckie, of Londonderry, tested a promising deposit near Pugwash, and discoveries were reported from various localities.

## GYPSUM.

The usual export trade was done at Windsor and the surrounding districts. The Mabou Gypsum Company have commenced work. Last year they shipped a few tons, but expect to do a large business this season. The following copy of an analysis of their gypsum will show that it is of excellent quality.

### MABOU GYPSUM.

LABORATORY CENTRAL AGRICULTURAL FARM, OTTAWA,

*August 7th, 1890.*

#### ANALYSIS.

Insoluble rock matter .....	.48
Lime.....	31.75
Magnesia .....	1.11
Sulphuric Acid .....	45.75
Iron, Alumina and Carbonic Acid .....	Traces.

#### PERCENTAGE COMPOSITION.

Sulphate of Lime, Gypsum .....	97.53
Sulphate of Magnesia.....	.92
Carbonate of Magnesia .....	.98
Insoluble Matter.....	.48
Moisture, etc.....	.09
	<hr/> 100.00

As this sample contains but 2.5 of foreign matter, it must be considered a very pure specimen of commercial gypsum, and one that is well adapted for all purposes for which this substance is used.

F. S. SHULTE, M. A., F. C. S.

## LIMESTONE.

The Londonderry Iron Company kept the McDonald quarry at Stewiacke going during the season.

## MARBLE.

The Bras d'Or Marble Co., limited, has been organized to work the large deposits of marble at Marble Mountain, West Bay, Cape Breton.

A large outlay has been made in the purchase of the latest improved quarrying machinery, including a Wardwell Channeler, gadder, etc., also portable boiler and engine, derricks, etc. The machinery is now



on the property, and the work of opening the quarry and producing marketable marble will be pushed as soon as the weather warrants in the spring of the coming year.

As is well known, the marble deposit is very extensive and of the finest quality, some of the white being pronounced by experts equal to the best Italian for statuary, while the colored and mottled varieties are very beautiful and in demand by the trade.

There is a large local demand for the lime, which by its superiority has rapidly won its way into favor, Nova Scotia, Prince Edward Island and Newfoundland buying largely, but the major part of last year's sales (total 44,000 lbs) was shipped to Boston and New York.

This Company gives direct employment at its works to upwards of 70 men, to say nothing of its being a large purchaser of cord wood and hoops from the residents near its works, and the shipping employed in freighting its stone and lime to different ports in Prince Edward Island, Nova Scotia and New England. Nearly 10,000 tons of stone were quarried.

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## JAMAICA EXHIBITION.

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Acting under your instructions I prepared for the Jamaica Exhibition a set of specimens illustrating the mineral resources of the Province, which were forwarded at the close of the year. I understand that they have been much admired. The collection would have been much larger and more complete had I received earlier notice; but the samples forwarded were all of good quality.

The list comprised:—Samples of round, stove, nut, slack, culm, coke, briquettes, etc., from the following companies:—Sydney and Louisburg Coal and Railway Co.; Low Point, Barasois and Lingan Co.; General Mining Association; Glace Bay Mining Co.; Intercolonial Coal Mining Co.

Samples of dressed and polished building stones, viz.:—Red and white granite, sandstone, freestone gray and red.

Three show cases with minerals from the Provincial Museum, exhibiting the economic mineralogy of Nova Scotia.

Exhibit from the Mabou Gypsum Company, showing crude, ground, calcined plaster, etc.

Exhibit from Londonderry Iron Co., showing ores, fluxes, fuels, etc., used there, with samples of pig and bar iron, steel, etc.

Mineral Map of Nova Scotia.

Case of gold specimens from Provincial Museum, collected in the various gold districts.

Large specimen of gold bearing quartz from Dufferin Mill, Salmon River, exhibited by Mr. K. Archibald.

I remain, Sir, Yours obediently.

E. GILPIN.

*Inspector of Mines.*

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No	Lessee.	District.	Area Square Miles.
COPPER			
ANTIGONISH COUNTY.			
2	Ross, McKay, et al.....	.....	1
	Grant, John, et al.....	.....	1
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	} Eastern Development Co. {	.....	1
95		.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
116	Greener, John.....	.....	1
	Matheson, A.....	.....	1
	McKenzie, Rod.....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F. (Lead).....	Gay's River.....	1
COLCHESTER COUNTY.			
	Clarke, Howard, (Lead) .....	Smithfield.....	1
INVERNESS COUNTY.			
	Herdman, I. E., et al.....	St. Ann's.....	1

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area Square Miles.
IRON.			
PICTOU COUNTY.			
65	Moore, W. B. ....	East River.....	1
44	Hudson, James.....	" .....	1
43	" .....	" .....	1
60	Cameron, N.....	" .....	1
	New Glasgow C. I. & R. R. Co ..	" .....	1
	Bartlett, J. H ..	" .....	5
	Townsend, W.....	" .....	3
	Ferguson, J. H.....	" .....	5
CAPE BRETON CO.			
86	Brookman, S. et al ...	N. Side East Bay.....	1
91	Brookman, S. L. ....	East Bay.....	1
93	Brookman, S. et al .....	" .....	1
102	C. L. Ingraham .....	" .....	1
103	A. McKenzie, et al .....	" .....	1
92	Matheson, D. et al .....	" .....	1
84	Protheroe, Pryse .....	Cow Bay.....	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.....	Whycocomagh .....	1
	Lawson, E. et al.....	" .....	1
GUYSBORO COUNTY.			
	New Glasgow C. I. & R. R. Co .....	Salmon River.....	2

Total area under lease.....42 square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		CUMBERLAND CO.				
21	Bligh, James, et al.....	.....	1	.....	John Moffatt .....	River Hebert.
47	Boston C. M. Co.....	.....	1		Jas. Baird.....	Maccan.
54	Cumberland C. M. Co.....	Chignecto. . .	4	Working.		
12	} Cumberland R'y & Coal Co.				J. R. Cowans... {	Springhill.
55		Springhill . . .	9	Working.	P. W. McNaughton	Joggins.
17		Joggins . . . . .	2	Working.	Jas. Baird .....	"
	Joggins C. M. Association..	Joggins . . . . .	2			
5	Joggins C. M. Co. ....	.....	2			
	Lawson C. M. Co. ....	Maccan. ....	1			
51, 53	Milner, Christopher .....	.....	2			
56	W. Patrick, et al. ....	Patrick. ....	1	....	W. Patrick....	Maccan.
57	Saltsprings Coal Co.....	.....	1	.....	J. L. Hewson....	Oxford.
		.....			W. Hall .....	Springhill.
16	Minudie M. & T. Co.....	.....	1	Working.	.....	River Hebert.
22, 23, 28, 29, 30	Styles Mining Co. (Ltd)....	.....	5	....	J. S. Hickman....	Amherst....
9	Victoria Coal Mining Co....	.....	2			
	I. H. Mathers.....	.....	1			
58, 59, 60, 61	Tupper, C. H.....	.....	4			
70	Cumberland R. R. & C. Co.	.....	9			
	Cowans & Cove. ....	.....	4			
	Annand Chas.....	.....	1			
63	Freeman, S. E. ....	.....	1			

Area under Lease.....56 square miles.

## LIST OF COAL LEASES.—(Continued.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	Acadia Coal Co.....	PICTOU CO. Fraser .....	1	Working.	H. S. Poole.....	Stellarton.
3	" .....	Acadia .....	1		J. Maxwell.....	Westville.
42	" .....	Pictou .....	4	Working.		
23	" .....	Vale .....	3	Working.	J. Dakers .....	Vale Colliery.
	" .....	Albion .....	4	Working.	J. Dunbar .....	Albion "
10	Gray, B. G., et al.....	.....	1			
11	Haliburton, R. G., et al.....	.....	1			
13, 14	Intercolonial Coal Co.....	.....	2			
12	" .....	Drummond ..	1	Working.	C. Fergie.....	Westville.
6	Montreal and New Glasgow ..	.....	1			
24	Richey, M. H.....	.....	1			
45	B. G. Gray.....	East River...	2	Working.	Muir & Son .....	New Glasgow.
46	New Glasgow I. C. & R. R. Co.	.....	1			
62	Acadia Coal Co.....	.....	1			
	Black Diamond C. M. Co.....	.....	2			
			26			
3	Archibald, Blowers.....	CP. BRETON CO. Gowrie.....	1	Working.	{ Archibald & Co. Chas. Archibald.	No. Sydney. Cow Bay.
2	Archibald, Thomas D.....	" .....	1			
5, 28	C. Belloni.....	Blockhouse ..	2	Working.	R. Belloni.....	Cow Bay.
29	" (sea area) .....	" .....	1			
	W. K. Reynolds, et al.....	.....	1			
119, 120, 121, 122, 123, 124	Sydney & Louisburg Cr. R. R. Co.	.....	6			

15	Kennelly, D. J. ....	Caledonia ..	1	Working.	David McKeen....	.....
31	Caledonia C. & R. Co. ....	.....	1			Glace Bay.
	" (sea area) ..	.....	1			
8, 9	Halifax Coal and Iron Co. ....	Ontario ....	1½	Working.	Jno. Sutherland..	Pt. Caledonia.
	General Mining Association..	Bridgeport....	2		{ Rich. H. Brown.	Sydney Mines.
27	" " ..	Sydney ...	18	Working.	{ Cunard & Morr'w	Halifax.
	" " (sea area) ..	"	4		{ H. Mitchell.....	Bridgeport.
	Low Point, Barasois, and ....	Lingan.....	13	Working.	{ R. Robson.....	Low Point.
38, 39	Lingan Mining Co. (Ltd) ....	"	10			
10, 21	Gibson, John, et al.....	:.....	2			
4, 12, 16	Glace Bay Mining Co. ....	Glace Bay...	3	Working.	{ E. P. Archbold ..	Halifax.
6, 13, 18, 19, 30	International Coal Co. (Ltd) ..	International	5	Working.	{ Chas. Rigby ...	L. Glace Bay.
66	Merchants' Bank of Canada..	Gardner ....	2		{ J. G. S. Hudson	Bridgeport.
52, 53	McLeod, Hugh .....	.....	2		{ J. S. McLellan..	Sydney.
40, 41, 42	Ross, H. E., et al. ....	.....	3			
79	Ross, W. J., et al. (sea area) ..	.....	1			
32	Weatherbe & Hendry, "	.....	3			
23, 25, 70	Sydney & Louisburg Coal and	Schooner P'd..				
14, 24	R. R. Co. (Ltd.) .....	Reserve. ....				
49	" " ..	Lorway .....	10			
64, 65, 68	" " ..	Emery.....		Working.	D. J. Kennelly ...	Sydney.
69	" " ..	.....				
54 to 63	Sydney C. M. Co. (sea areas) ..	.....	1			
67	Weatherbe & Kirby .....	.....				
78	Weatherbe, R. L. (sea area) ..	.....	5			
96, 97, 98, 99, 100	Low Point, Barasois and Lin-	.....	5			
	gan Mining Co. (Ltd) .....	.....	1			
	" (sea areas)	.....				

MINES REPORT.

LIST OF COAL LEASES.—Continued.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
112, 113, 114 108, 109, 110	Hamilton, A. G., et al	.....	1			
	Roberts, Frank	.....	1			
	Mosely, F.	.....	1			
	Cowans & Drummond	.....	5			
	Ross, W. and McLean, Jno.	.....	3			
			<u>128½</u>			
7, 12 13 4 11 6 10	Inverness C. I. & R. C.	INVERNESS CO.	2			
	McGregor, J. D.	.....	3			
	Richey, M. H., et al	Port Hood	1			
	Ross, W. J.	.....	1			
	Ross, H. E., et al, (sea area)	Broad Cove	1			
	Tremain, E. D., (sea area)	.....	1			
	Fraser, W. J.	.....	2			
			<u>11</u>			
• 3, 4, 5	Kenney, T. E.	VICTORIA CO.	3			
	Ross, Wm.	New Cambell't'n Black Rock	5			
			<u>8</u>			
	Terminal City Co.	RICHMOND CO. Caribou Cove	1			
Total area under lease			272½	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter .....	135,613	123,081	101,138	84,374	88,631	6,174	.....	.....	325,382	213,629
2nd " .....	124,225	109,324	117,355	102,097	283,247	260,870	.....	.....	524,827	472,291
3rd " .....	66,356	60,449	134,107	131,279	377,651	413,130	.....	.....	578,114	604,858
4th " .....	163,955	145,754	123,025	112,759	268,698	236,820	.....	.....	555,678	495,333
Total .....	490,149	438,608	475,625	430,509	1,018,227	916,994	.....	.....	1,984,001	1,786,111
1889 .....	490,441	419,628	431,380	383,482	834,458	751,997	.....	.....	1,756,279	1,555,107



TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
NOVA SCOTIA:													
Land Sales .....	57,753	35,255	6,725	136,332	100,101	.....	7,853	4,093	390	201,938	139,449	7,115	348,502
Sea borne .....	574	154	.....	33,588	7,732	.....	169,232	25,161	17,003	203,394	33,047	17,003	253,444
Nova Scotia Total .....	58,327	35,409	6,725	169,920	107,833	.....	177,085	29,254	17,393	405,332	172,496	24,118	601,946
New Brunswick .....	103,287	20,218	24,907	23,164	5,367	.....	45,193	2,376	274	171,644	27,961	25,181	224,786
Newfoundland .....	.....	.....	.....	118	49	.....	93,362	2,048	456	93,480	2,197	456	96,133
P. E. Island .....	.....	.....	.....	6,748	26,202	.....	12,730	10,035	128	19,478	36,237	128	55,843
Quebec .....	46,766	15,301	118,941	84,175	6,286	.....	379,487	97,148	3,827	510,428	118,735	122,768	751,931
West Indies .....	.....	.....	.....	358	.....	.....	4,360	.....	.....	4,718	.....	.....	4,718
United States .....	117	8,610	.....	.....	289	.....	30,247	11,591	.....	30,364	20,390	.....	50,754
Total .....	208,497	79,538	150,573	284,483	146,026	.....	742,464	152,452	22,078	1,235,444	378,016	172,651	1,786,111

# MINES REPORT.

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## COAL.—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1890.	Year 1889.
Nova Scotia :						
Land Sales . . . .	86,674	78,222	66,302	117,304	348,502	314,281
Sea Borne . . . .	7,381	63,067	89,415	93,591	253,454	236,144
N. S. Total . . . .	94,055	141,289	155,717	210,895	601,956	550,425
New Brunswick . .	52,083	50,042	53,466	69,185	224,776	195,174
Newfoundland . . .	1,130	24,078	38,734	32,091	96,033	87,543
P. E. Island . . . . .		14,750	24,064	17,029	55,843	54,940
Quebec . . . . .	64,851	233,521	322,653	130,906	751,931	631,796
West Indies . . . .	617	2,062	457	1,582	4,718	3,983
United States . . . .	893	6,549	9,767	33,645	50,854	29,986
Other Countries . . . . .						1,260
Total . . . . .	213,629	472,291	604,858	495,333	1,786,111	1,555,107
1889 . . . . .	181,366	374,686	571,436	427,619	1,555,107	.....

## COAL.—GENERAL STATEMENT.

1890.	Produce.	Sold.	Colliery Consump- tion.
1st Quarter . . . . .	325,382	213,629	33,354
2nd " . . . . .	524,827	472,291	47,919
3rd " . . . . .	578,114	604,858	42,113
4th " . . . . .	555,678	495,333	37,854
Total . . . . .	1,984,001	1,786,111	161,240
1889 . . . . .	1,756,279	1,555,107	158,131

MINES REPORT.

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR 1890.

COLLIERY.	Raised.	SOLD.			Total Sold.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
CUMBERLAND Co.							
Chignecto.....	10,121	5,142	2,345	.....	7,487	2,037	388
Joggins.....	60,876	48,764	4,645	.....	53,409	6,058	1,408
Minudie.....	.....	.....	.....	.....	.....	.....	.....
Salt Springs.....	140	140	.....	.....	140	.....	.....
Springhill.....	419,012	154,451	72,548	150,573	377,572	23,630	6,416
PICTOU Co.							
Acadia.....	274,932	154,258	88,439	.....	242,697	23,896	6,351
Black Diamond.....	33,277	22,188	10,113	.....	32,301	725	251
East River.....	1,360	955	.....	.....	955	395	185
Intercolonial.....	107,739	107,082	47,474	.....	154,556	7,232	2,582
*Holmes.....	58,306	.....	.....	.....	.....	.....	.....
CAPE BRETON.							
Bridgeport.....	28,223	27,748	944	.....	28,692	258	463
Caledonia.....	156,174	103,780	41,593	.....	145,373	1,579	2,136
Franklyn.....	723	511	212	.....	723	.....	.....
Glace Bay.....	111,472	100,089	8,401	.....	108,490	4,323	1,560
Gowrie.....	141,099	103,928	20,713	.....	124,641	4,990	5,380
International.....	143,091	95,144	37,932	.....	133,076	5,061	2,681
Ontario.....	9,049	7,749	638	.....	8,387	569	93
Reserve.....	156,906	122,239	17,538	.....	139,777	10,637	3,330
Sydney.....	181,571	133,237	17,231	.....	150,468	13,986	10,335
Victoria.....	90,930	48,039	7,250	22,078	77,367	8,483	3,822
Total.....	1,984,001	1,235,444	378,016	172,651	1,786,111	113,859	47,381

\*Included in Intercolonial sales, etc.

COLLIERY CONSTRUCTION ACCOUNT, 1890.

MINES REPORT.

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COLLIERIES.	Shafts.	Slopes.	Levels.	Machin'ry.	Colliery Buildings.	Dwellings.	Surface Works.	Wharves.	Prospect-ing.	Railways.	TOTAL.
CUMBERLAND Co.											
Chignecto.....	.....	.....	.....	.....	.....	.....	.....	.....	\$2283	.....	\$ 2,283
Joggins.....	\$624	\$229	\$2390	.....	.....	.....	.....	.....	.....	.....	3,243
Minudie.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Saltsprings.....	50	270	160	.....	.....	.....	.....	.....	280	.....	740
Springhill.....	.....	.....	.....	.....	\$2300	.....	\$5165	.....	732	.....	8,197
Pictou Co.											
Acadia.....	.....	28	.....	4032	3004	.....	11	.....	.....	\$548	7,623
Barton.....	20	100	15	50	16	.....	10	.....	40	.....	251
Black Diamond.....	.....	.....	.....	.....	.....	.....	.....	.....	800	.....	800
East River.....	.....	.....	.....	475	.....	.....	.....	.....	.....	.....	475
Intercolonial.....	.....	.....	.....	605	13823	.....	.....	.....	.....	14080	28,508
CAPE BRETON Co.											
Bridgeport.....	.....	.....	.....	.....	60	.....	.....	.....	.....	90	150
Caledonia.....	.....	1527	1925	34	.....	.....	.....	.....	.....	.....	3,486
Emery.....	611	.....	300	200	300	.....	827	.....	.....	.....	2,238
Glace Bay.....	.....	.....	2292	.....	.....	.....	.....	.....	.....	790	3,082
Gowrie.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
International.....	300	388	1583	200	.....	.....	.....	.....	.....	4230	6,701
Ontario.....	.....	.....	15	651	.....	\$121	.....	.....	152	.....	939
Reserve.....	.....	660	1363	.....	.....	.....	.....	.....	.....	.....	2,023
Sydney.....	.....	.....	.....	977	.....	.....	.....	.....	.....	.....	977
Victoria.....	.....	.....	9874	.....	.....	.....	.....	.....	.....	.....	9,874
Totals.....	\$1615	\$3202	\$19917	\$7224	\$19493	\$121	\$6013	.....	4267	\$19738	\$81,590

## MINES REPORT.

Statement of the Number and Classes of Men employed, etc., at each Colliery during the year 1890.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		No. of tons per cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.
	Skilled Labor.	Lab'rs.	Boys.	Days Labor.	Skilled Labor.	Lab'rs.	Boys.	Days Labor.	Skilled Labor.	Lab'rs.	Boys.	Days Labor.	Persons.	Days Labor.			Above.	Below.	
Chignecto.....	19	6	6	6873	7	12	5	5871	...	...	...	...	55	12744	532	50	2	2	203
Joggins.....	73	22	22	32817	7	31	2	11171	...	...	...	...	157	43988	933	203	3	9	297
Salt Springs.....	4	...	3	156	2	8	4	107	8	2	2	280	33	543	...	...	...	...	...
Springhill.....	490	216	163	199178	122	193	29	73451	...	...	...	...	1213	272629	855	1773	12	50	225
Acadia.....	280	265	73	148958	50	133	34	74882	3	6	...	5536	844	229376	982	1117	19	17	246
Barton.....	4	1	...	47	2	6	...	42	...	...	...	...	13	89	...	...	1	...	...
Black Diamond.....	10	13	4	7330	3	8	2	3887	...	...	...	...	40	11217	...	...	1	2	200?
East River.....	3	1	...	700	1	...	...	274	...	...	...	...	5	974	...	...	...	...	205
Intercolonial.....	149	66	51	77319	40	56	12	32949	2	3	...	1108	379	111376	1114	566	5	12	293
Bridgeport.....	34	2	6	11453	2	5	1	3000	...	...	...	...	50	14453	830	116	2	6	243
Caledonia.....	142	19	38	46467	23	40	12	17960	10	...	4	2688	288	67115	1030	630	8	30	243
Emery.....	36	13	5	12498	4	18	...	4921	6	...	3	693	85	18112	...	...	...	9	168
Franklyn.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glace Bay.....	140	13	26	30759	39	35	5	18982	...	...	...	...	258	49741	800	518	4	19	215
Gowrie.....	140	20	45	41927	26	62	19	27487	...	...	...	...	312	69414	1000	800	9	25	176
International.....	127	20	38	51063	32	82	20	37258	...	...	...	...	319	88321	1126	628	7	31	228
Ontario.....	20	4	7	3105	4	10	1	1776	...	...	...	...	46	4881	...	...	3	4	157
Reserve.....	135	28	48	53373	46	40	15	29295	1	...	...	118	313	92876	1150	600	7	23	261
Sydney.....	242	52	122	106050	60	90	38	52286	2	2	1	1176	699	159522	750	678	9	60	268
Victoria.....	117	60	26	50412	7	80	15	27201	...	...	...	...	305	77613	776	333	5	7	273
Totals.....	2165	821	683	880485	477	909	214	422810	32	13	10	11599	5324	1314984	...	...	97	306	...

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1871	165,431	\$1 25
1851	116,274	"	1872	154,092	75
1852	87,542	"	1873	264,760	"
1853	120,764	"	1874	138,336	"
1854	139,125	Free.	1875	89,746	"
1855	103,222	"	1876	71,634	"
1856	126,152	"	1877	118,216	"
1857	123,335	"	1878	88,495	"
1858	186,743	"	1879	51,641	"
1859	122,720	"	1880	123,423	"
1860	149,289	"	1881	113,728	"
1861	204,457	"	1882	99,302	"
1862	192,612	"	1883	102,755	"
1863	282,775	"	1884	64,515	"
1864	347,594	"	1885	34,483	"
1865	465,194	"	1886	66,003	"
1866	404,252	"	1887	73,892	"
1867	338,492	\$1 25	1888	30,198	"
1868	228,132	"	1889	29,986	"
1869	257,485	"	1890	50,854	"
1870	168,180	"			

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

## MINES REPORT.

*Nova Scotia Coal Sales, from 1785 to 1890 (Inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	106,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	51,048	1847	201,650	1,538,798
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320		1851	153,499	
1796	5,249		1852	188,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775	70,452	1857	294,198	2,399,319
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130		1861	326,429	
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516	91,527	1867	471,184	4,927,339
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336		1871	596,418	
1816	8,619		1872	785,914	
1817	9,284		1873	811,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980		1876	634,207	
1821	11,388	140,820	1877	697,065	7,317,430
1822	7,512		1878	693,511	
1823	27,000		1879	688,828	
1824			1880	954,659	
1825			1881	1, 14	
1826			1882	1, 79	
1827	12,600		1883	1, 23	
1828	12,149		1884	1, 50	
1829	20,967		1885	1, 10	
1830	21,935		1886	1, 66	
1831	27,269	1887	1, 84		
1832	37,170	1888	1, 92	13,910,136	
1833	50,369	1889	1, 07		
1834	64,743	1890	1, 11		
1835	50,813	Total..	31,296,172		
1836	56,434				
1837	107,593				
1838	118,942				
1839	106,730				
1840	145,962				
1841	101,198	839,954			

## SUMMARY.

1785 to 1790.....	14,349	1841 to 1850.....	1,538,798
1791 to 1800.....	51,048	1851 to 1860.....	2,399,319
1801 to 1810.....	70,452	1861 to 1870.....	4,927,339
1811 to 1820.....	91,527	1871 to 1880.....	7,317,430
1821 to 1830.....	140,820	1881 to 1890.....	13,910,136
1831 to 1840.....	839,954		

GOLD—GENERAL STATEMENT FOR YEAR 1890.

MINES REPORT

DISTRICT.	Number of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per Ton.		Total Yield of Gold.	
					Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Brookfield .....	1	.....	1	2500	..	13	1643	5 ..
Caribou, } .....	3	17748	5	6661	..	4	1576	19 8
Moose River, } .....	2	6089	2	3017	..	15	2305	2 18
Fifteen Mile Stream .....	1	4333	1	1008	..	15	779	5 ..
Lake Catcha.....	6	22569	3	6633	..	11	3883	12 12
Malaga .....	3	6911	3	1411	1	12	2263	1 ..
Montagu .....	2	8469	1	1122	2	9	2774	13 20
Oldham.....	1	6657	2	1892	1	..	1899	15 ..
Rawdon .....	2	3778	2	760	..	6	253	10 12
Renfrew.....	1	19408	1	6415	..	6	2070	.. ..
Salmon River.....	3	9130	2	1032	..	11	616	15 12
Stormont .....	3	14196	3	2525	..	12	1612	2 13
Uniacke .....	4	17679	3	3509	..	2	482	12 ..
Waverley .....	1	11787	2	960	..	17	840	3 1
Whiteburn .....	5	11410	5	3284	..	8	1357	11 9
Unproclaimed, etc .....	38	160164		42749	..	11	24358	9 9



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MONTH.	BROOKFIELD.						CARIBOU AND MOOSE RIVER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.								
					Oz.	Dwt.	Gr.						
January	..	..	..	456	323	16	..	1844	73	551	122	17	15
February	..	..	..	474	241	10	..	1749	70	394	114	8	16
March	..	..	..	455	161	10	..	2155	86	577	114	19	..
April	..	..	..	465	548	10	..	2189	87	666	99	12	12
May	..	..	..	244	170	..	..	2029	81	277	137	3	4
June	..	..	..	210	104	6	..	1855	74	925	143	16	17
July	..	..	..	196	93	13	..	694	27	500	119	13	11
August	..	..	..	..	..	..	..	615	24	553	139	..	21
September	..	..	..	..	..	..	..	713	28	635	145	9	3
October	..	..	..	..	..	..	..	1427	57	701	154	17	0
November	..	..	..	..	..	..	..	1387	56	598	166	9	2
December	..	..	..	..	..	..	..	1091	43	384	119	12	3
Total	..	..	..	2500	1643	5	..	17748	..	6661	1576	19	8

MONTHLY STATEMENT FROM EACH GOLD DISTRICT—Continued.

MONTH.	FIFTEEN MILE STREAM.						LAKE CATCHA.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January.....	1	650	26	120	63	..	1	74	3	94	103	..
February.....	1	660	26	168	116	15	1	66	2	96	86	10
March.....	1	759	30	252	132	1	1	69	3	170	131	5
April.....	1	675	27	197	152	11	1	1011	40	298	105	..
May.....	1	400	16	145	234	..	1	947	38	182	79	10
June.....	1	386	15	75	10	..	1	645	26	130	99	..
July.....	1	920	32	106	38	17	2	179	7	38	175	..
August.....	1	735	29	354	207	3	2	299	12	...	..	..
September.....	1	954	38	412	269	15	2	361	14	...	..	..
October.....	..	.....	.....	358	414	13	1	270	11	...	..	..
November.....	..	.....	.....	454	440	7	1	175	7	...	..	..
December.....	..	.....	.....	376	236	..	1	237	9	...	..	..
Total.....	1	6089	.....	3017	2305	2	1	4333	....	1008	779	5
						18						0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MALAGA.					MONTAGUE.								
	No. of Mines.	Days' Labor.	No. Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January.....	3	1481	60	314	276	0	0	2	964	38	130	385	15	0
February.....	3	2127	85	520	302	0	0	2	878	35	87	154	18	0
March.....	3	2089	43	527	284	15	0	2	916	36	137	225	8	0
April.....	2	1929	77	50	36	15	0	1	272	11	136	222	4	0
May.....	2	1657	66	354	275	4	0	1	340	13	75	137	10	0
June.....	2	1827	73	585	250	13	0	1	348	14	149	195	3	0
July.....	.....	.....	.....	743	758	0	0	1	786	31	111	154	12	0
August.....	.....	.....	.....	839	453	13	12	1	724	28	105	134	2	0
September.....	.....	.....	.....	741	275	12	0	1	827	33	106	149	16	0
October.....	4	3244	130	545	126	6	0	1	231	9	141	202	13	0
November.....	4	3865	154	819	466	10	0	1	309	12	126	152	3	0
December.....	4	4350	174	596	378	4	0	1	316	16	108	148	11	0
Totals.....	6	22569	.....	6633	3883	12	12	1	6911	....	1411	2263	1	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	OLDHAM.						RAWDON.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January.....	2	831	23	67	155	0	0	1	966	38	175	177	0	0
February.....	2	734	29	77	52	10	19	1	882	35	.....	.....	.....	.....
March.....	2	800	32	91	133	7	0	1	767	31	110	85	0	0
April.....	.....	.....	.....	139	101	4	0	1	210	8	.....	.....	.....	.....
May.....	.....	.....	.....	168	327	14	18	1	190	7	.....	.....	.....	.....
June.....	.....	.....	.....	63	885	11	0	1	200	8	155	132	0	0
July.....	2	940	37	109	443	19	23	2	1261	50	210	570	15	0
August.....	2	1094	44	28	26	9	0	2	1085	43	140	184	10	0
September.....	2	1015	40	.....	.....	.....	.....	2	1096	44	335	235	10	0
October.....	2	1038	41	.....	.....	.....	.....	.....	.....	.....	342	224	0	0
November.....	2	1072	43	310	631	3	0	.....	.....	.....	375	177	0	0
December.....	2	945	36	70	17	14	8	.....	.....	.....	50	114	6	0
Total.....	2	8469	.....	1122	2774	13	20	1	6657	.....	1892	1899	15	0

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	RENFREW.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January .....	2	456	18	14	20	9	..	1	1404	56	650	181	..	..
February .....	2	458	18	473	84	..	..	1	1387	55	500	160	..	..
March .....	2	639	25	51	33	18	..	1	1461	58	400	173	10	..
April .....	2	545	22	85	40	17	5	1	1411	57	700	203	10	..
May .....	2	547	26	...	..	..	..	1	1445	58	740	213	..	..
June .....	2	415	17	76	45	19	..	1	1508	60	737	233	..	..
July .....	1	79	3	12	11	..	..	1	1731	70	600	202	..	..
August .....	1	123	5	...	..	..	..	1	1797	72	500	197	..	..
September .....	1	159	6	26	6	9	9	1	1791	79	400	135	..	..
October .....	1	142	6	21	10	4	4	1	1940	77	475	103	..	..
November .....	1	118	5	2	1	2	18	1	1988	79	400	113	..	..
December .....	1	97	4	...	..	..	..	1	1545	62	313	156	..	..
Total .....	2	3778	...	760	253	10	12	1	19408	...	6415	2070	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	STORMONT.					UNIACKE.								
	No. of Miners.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Miners.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January.....	3	1524	61	297	160	4	..	2	1365	54	170	78	..	2
February.....	3	1158	46	257	138	3	..	2	1323	53	227	190	2	15
March.....	3	1292	51	255	134	10	..	2	1262	50	260	104	1	..
April.....	2	745	30	28	15	8	12	3	1428	57	304	272	19	10
May.....	2	747	30	30	19	2	..	3	1631	65	272	285	3	10
June.....	2	606	24	32	28	..	..	3	1421	57	194	229	6	15
July.....	2	164	7	40	41	8	..	3	1151	46	148	213	9	18
August.....	2	174	7	29	27	6	..	3	847	34	232	28	5	..
September.....	2	166	7	27	18	15	..	3	785	31	207	84	6	..
October.....	3	796	32	.....	....	..	..	3	888	35	150	19	5	..
November.....	3	910	36	42	20	14	..	3	1003	40	222	43	19	15
December.....	3	848	34	15	13	5	..	3	1087	43	139	63	4	..
Total.....	3	9130	....	1052	616	15	12	3	14196	....	2525	1612	2	13

## MINES REPORT.

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	RENFREW.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.					Oz.	Dwt.	Gr.
January .....	2	456	18	14	20	9	..	1	1404	56	650	181	..	..
February .....	2	458	18	473	84	..	..	1	1387	55	500	160	..	..
March .....	2	639	25	51	33	18	..	1	1461	58	400	173	10	..
April .....	2	545	22	85	40	17	5	1	1411	57	700	203	10	..
May .....	2	547	26	...	..	..	..	1	1445	58	740	213	..	..
June .....	2	415	17	76	45	10	..	1	1508	60	737	233	..	..
July .....	1	79	3	12	11	..	..	1	1731	70	600	202	..	..
August .....	1	123	5	...	..	..	..	1	1797	72	500	197	..	..
September .....	1	159	6	26	6	9	9	1	1791	79	400	135	..	..
October .....	1	142	6	21	10	4	4	1	1940	77	475	103	..	..
November .....	1	118	5	2	1	2	18	1	1988	79	400	113	..	..
December .....	1	97	4	...	..	..	..	1	1545	62	313	156	..	..
Total .....	2	3778	...	760	253	10	12	1	19408	...	6415	2070	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	STORMONT.					UNIAOKE.							
	No. of Miners.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.				Oz.	Dwt.	Grs.
January.....	3	1524	61	297	160	4	..	1365	54	170	78	..	2
February.....	3	1158	46	257	138	3	..	1323	53	227	190	2	15
March.....	3	1292	51	255	134	10	..	1262	50	260	104	1	..
April.....	2	745	30	28	15	8	12	1428	57	304	272	19	10
May.....	2	747	30	30	19	2	..	1631	65	272	285	3	10
June.....	2	606	24	32	28	..	..	1421	57	194	229	6	15
July.....	2	164	7	40	41	8	..	1151	46	148	213	9	18
August.....	2	174	7	29	27	6	..	847	34	232	28	5	..
September.....	2	166	7	27	18	15	..	785	31	207	84	6	..
October.....	3	796	32	.....	....	..	..	888	35	150	19	5	..
November.....	3	910	36	42	20	14	..	1003	40	222	43	19	15
December.....	3	848	34	15	13	5	..	1087	43	139	63	4	..
Total.....	3	9130	.....	1052	616	15	12	14196	.....	2525	1612	2	13



## MINES REPORT.

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WAVERLEY.						
	No. of Mines.	Days' Labor	No. of Men.	Tons. Crushed.	Yield of Gold.		
					Oz.	Dwt.	Gr.
January .....	3	1281	51	.....	..	..	..
February .....	3	1314	52	.....	..	..	..
March .....	3	1394	57	.....	..	..	..
April .....	3	1370	55	.....	..	..	..
May .....	3	1164	46	110	34	7	0
June .....	3	1137	45	.....	..	..	..
July .....	3	718	28	120	40	15	0
August .....	3	826	33	95	34	0	0
September .....	3	817	32	.....	..	..	..
October .....	5	2439	93	1143	121	0	0
November .....	5	2683	107	1076	140	0	0
December .....	4	2536	101	965	112	10	0
Total .....	4	17679	.....	3509	482	12	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WHITEBURN.						UNPROCLAIMED.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January.....	1	1637	65	175	115	7	2	6	682	27	281	83	13	0
February.....	1	1387	55	35	52	2	3	6	787	31	66	38	12	6
March .....	1	1311	52	103	91	19	16	7	850	34	288	94	3	22
April .....	...	.....	...	120	120	12	17	4	613	24	137	35	9	12
May .....	...	.....	...	140	146	17	10	3	585	23	53	8	6	0
June .....	...	.....	...	90	78	9	18	4	618	24	181	35	18	0
July.....	1	296	12	.....	..	..	..	6	1913	76	250	78	19	0
August .....	1	250	10	.....	..	..	..	7	1231	49	284	80	16	12
September.....	1	375	15	.....	..	..	..	8	1474	59	478	104	10	0
October .....	3	2597	104	.....	..	..	..	4	1176	47	353	474	8	0
November.....	3	1954	80	97	100	9	18	5	722	29	474	180	4	0
December .....	2	1980	79	200	134	4	13	5	759	30	239	142	11	15
Total.....	1	11787	.....	960	840	3	1	5	11410	...	3284	1357	11	9

## GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Grs.		Oz.	Dwt.	Grs.		A Year.	A Day.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,922	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3 <sup>2</sup>	20	12081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22202	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
1890	24358	9	9	42749		11	9	160,164	2 73	719
	506675	6	6	693191	.....			4,475,066	.....	.....

# MINES REPORT.

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## INTERCOLONIAL RAILWAY.

*Statement showing number of Tons of Coal received at the following Stations, from Mines in Nova Scotia, for Year ending 31st December, 1890.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax .....	49,549.50	East Mines .....	3,970.00
Dartmouth .....	9,192.00	Londonderry .....	66,129.00
Bedford .....	557.00	Folleigh .....	12.00
Windsor Junction ..	7,336.00	Wentworth ..	18.00
Wellington ..	128.00	Westchester .....	22.00
Enfield.. ..	522.00	Greenville .....	6.00
Elmsdale .....	219.00	Oxford Junction ..	16.00
Milford .....	36.00	Oxford .....	1,094.50
Shubenacadie .....	394.00	Pugwash .....	115.00
Stewiacke ..	602.00	Wallace .....	72.00
Brookfield .....	121.50	Tatamagouche ..	66.00
Truro ...	10,027.50	Denmark .....	32.00
Valley .....	14.00	River John .....	224.00
Riversdale .....	12.00	Scotsburn .....	272.50
West River .....	30.00	River Philip .....	6.00
Lansdowne ...	6.00	Athol .....	18.00
Glengarry .....	29.00	Maccan .....	24.00
Hopewell .....	1,882.50	Nappan .....	58.00
Stellarton .....	9,191.50	Amherst .....	8,600.00
Sylvester's .....	124.00	Fort Lawrence ....	1,003.50
Pictou Landing ....	65,211.00	Aulac .....	1,420.00
Pictou .....	9,403.00	Sackville .....	4,410.00
New Glasgow .....	41,247.00	Dorchester .....	966.50
Merrigomish .....	172.00	Memramcook .....	201.00
Piedmont .....	17.00	Painsec Junction ..	12.00
Avondale .....	47.00	Shediac ..	305.00
James River .....	57.00	Point du Chene ....	55.00
Antigonish .....	2,170.50	Moncton .....	20,052.50
South River .....	18.00	Salisbury .....	873.00
Heatherton .....	29.00	Hillsboro .....	230.00
Tracadie .....	96.00	Petitcodiac .....	854.00
Harbor au Bouche..	73.50	Penobsquis .....	587.00
Bayfield .....	10.00	Sussex .....	324.50
Mulgrave .....	2,634.00	Apohaqui .....	6.00
Hawkesbury .....	18.00	Norton .....	62.00
Hastings .....	12.00	Hampton .....	613.00
Onslow .....	13.00	Rothsay .....	207.00
Belmont .....	44.50	Cold Brook .....	7,159.00
Debert .....	18.00	St. John .....	48,935.00

INTERCOLONIAL RAILWAY—*Continued.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Weldford .....	30.00	Campbellton .....	24.00
Kent Junction ....	679.00	Metapedia .....	24.00
Rogersville .....	6.00	Cedar Hall .....	6.00
Chatham Junction..	2,808.00	Little Metis .....	6.00
Chatham .....	16.00	St. Octave .....	6.00
Millerton .....	30.00	St. Flavie .....	12.00
Newcastle .....	28.00	Rimouski .....	41.00
Gloucester Junction.	336.00	St. Eloie ... ..	24.00
Bathurst .....	18.00	Riviere du Loup....	2,436.00
Petite Roche .....	6.00	Riviere Ouelle ....	6.00
Jacquet River .....	12.00	St. Henri .....	20,608.00
New Mills .....	18.00	Chaudierre Junction.	70,074.00
Charlo .....	6.00	Pts. West Chaudierre	42,576.50
Eel River .....	6.00	Point Levis .....	4,077.00
Dalhousie Junction..	17.00		
Dalhousie .....	6.00	Total .....	524,238.00

STATIONS FROM	No. of Tons.
Maccan .....	21,813.00
Springhill .....	231,037.00
Stellarton .....	197,709.00
Westville .....	44,312.00
New Glasgow .....	29,367.00
Total .....	524,238.00

INTERCOLONIAL RAILWAY.

Statement showing the Quantities in Tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1890.

MONTHS.	SPRINGHILL.		JOGGINS.		ACADIA.			DRUMMOND.		BLACK DIAM'ND	SALT SPRINGS	GLACE BAY M'N'G Co.	INTER-NATIONAL
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Coke.	Round,	Coke.	Round,	R. of M.	Round.	Round.
January ..	11718	.....	1666		4630	28	.....	2671	....	1499	.....	.....	.....
February..	11321	.....	1228		4055	48	21	557	....	1161	.....	.....	.....
March ....	11774	16	1380		5663	20	.....	1834	....	1180	.....	.....	.....
April .....	8678	.....	1355		4223	.....	13	3736	....	886	.....	.....	.....
May .....	7156	47	3167		1842	76	.....	873	....	880	.....	.....	.....
June .....	6618	116	3656		1269	44	.....	308	....	572	.....	.....	.....
July .....	.....	.....	3202		4171	72	12	707	....	.....	.....	.....	.....
August.....	1735	.....	2474		4904	14	.....	862	....	.....	.....	.....	.....
September.	12971	.....	2404		3905	.....	.....	448	25	.....	20	489	.....
October ...	16676	83	.....		4643	59	.....	1084	....	.....	.....	374	.....
November..	15333	88	.....		4041	.....	.....	2654	....	.....	.....	.....	45
December .	12873	124	.....		3548	109	15	3945	....	.....	.....	.....	215
	116853	454	20532	11761	46894	479	61	19679	25	6278	20	863	260

## MINES REPORT.

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 MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.
 

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## GYPSUM.

	Tons.	Value.
Baddeck and outports.		
Windsor.....	112,264	\$112,264
Cheverie .....	26,071	19,533
"    (local) .....	254	
Walton .....	6,300	5,750
Mabou .....	298	298
Halifax .....	346	1 688
Arichat .....	470	470

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 MANGANESE.

	Tons.	Value.
Springville, N. S. ....	37	
*Tennycap " .....	75	
+ " " .....	134	134
Lochlomond, C. B.		

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 ANTIMONY.

	Tons.	Value.
‡Rawdon .....	265	\$625

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 MOULDING SAND.

	Tons.	Value.
Windsor (Newport) .....	170	\$750
River Hebert.....	150	

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 BUILDING STONE, ETC.

	Tons.	Value.
Amherst ... ..	3178	\$16,740
"    (Grindstones) .....		7,870
Pugwash .....	687	

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 LIMESTONE.

	Tons.	Value.
Bras d'Or Lime Co. . . . .	10,000	
Springville, N. S. ....	651	
Londonderry Iron Co.....	15,174	

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 \*Worked nine months, average 4 men employed.

†Manganese Rock. Value, \$134.

‡From dumps.

|Burned into lime for local consumption and export.

IRON MINING.

Londonderry .....	40,486	Tons.
Bridgeville .....	1,921	"
Brookfield ..	1,520	"
Torbrook .	1,365	"
Nictaux .....	1,240	"
Pugwash .....	500 (?)	"

AVERAGE FORCE EMPLOYED DAILY AT LONDONDERRY.

	Ore Mining.	Men.	Days' Work.
Skilled workmen :—	Underground .....	67	17,602
"	Above ground .....	14	4,276
Unskilled workmen :—	Underground .....	54	13,971
"	Above ground .....	40	8,254

LIMESTONE QUARRY.

Skilled workmen .....	3	835
Unskilled workmen .....	17	2,835

Estimated No. of men employed at Nictaux or elsewhere iron mining—20.



EXPORT STATEMENT.—Goods the Product of the Mine from the Port of Halifax,  
for the Year ending 31st December, 1890.

ARTICLE.	THE PRODUCE OF CANADA.		NOT THE PRODUCE OF CANADA.		TOTAL EXPORTS.
	Quantity.	Value.	Quality.	Value.	
Coal .....	39,067	\$123,574	5784	15,055	138,629
Gold .....	.....	304,521	.....	.....	304,521
Gypsum .....	346	1,688	.....	.....	1,688
Antimony .....	26½	625	.....	.....	625
Ores, all kinds N. S. ....	12	375	.....	.....	375
Salt .....	.....	.....	.....	18,316	18,316
Other Articles .....	.....	151	.....	296	447
		\$430,934		\$33,667	\$464,601





**REPORT**  
**ON THE**  
**SPRINGHILL DISASTER,**  
**BY EDWIN GILPIN, Jr., A. M., F. G. S.,**

Fellow of the Royal Society of Canada, etc., Inspector  
of Mines.

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HALIFAX, March 17, 1891.

THE HON. C. E. CHURCH,  
*Commissioner Public Works and Mines.*

SIR,—I beg leave to report on the late explosion at the collieries of the Cumberland Railway and Coal Company, Ltd., as follows, after discussion and consultation with Mr. William Madden, Jr., Deputy Inspector :

The explosion occurred on February 21st, about one o'clock in the day, and caused the death of 125 men and boys. The seat of the explosion was in the No. 6 and No. 7 balances of the 1900 feet west level of the East Slope the farthest in workings. These balances about 600 feet in length, extend from the 1900 to the 1300 feet levels, and take the coal from the usual horizontal "bords" or working places. From the evidence attainable at the inquest held by Dr. Black, of Amherst, and the results of the investigation held by me under oath and hereto appended, I beg to make the following remarks :

These balances were connected with the 1300 or Stony level, and were ventilated by air from the lower level, which was divided between the balances and uniting at the 1300 feet level ventilated the workings above that level, and passed to its outlet beyond the faces of the workings above the 800 feet level. The air was provided by a down cast fan, and appeared to be ample for the extent of workings. From repeated examinations the explosion appeared to have started from a point about the centre of No. 7 balance (the furthest in balance) and to have gone up and down the balance, wrecking the working places branching off it. Also to have penetrated into No. 6 balance through the lower working places in it, which had been worked

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through into No. 7 balance, and in a similar manner to have wrecked it and the working places branching off it. As the connections between the top of the balance and the 1300 feet level were comparatively small, the force of the explosion extended but a few yards through them into that level. The openings into the 1900 feet level being larger, the explosion was felt severely at the foot of the balances, and the two levels were wrecked into their faces a distance of about 400 feet, and towards the slope for a distance of about 1500 feet. The force of the explosion was slightly felt at the bottom of the slope, and did not attract attention at the surface, except by a momentary agitation of the fan at the east slope and a slight puff of air at the west slope in the underlying seam, which was connected by a tunnel with the east slope seam, a few yards from the top of the No. 6 and 7 balances. The explosion ignited some canvass brattice and boards in the No. 6 balance, but this was extinguished without difficulty.

The workings of the No. 7 balance were naturally very dusty, and were systematically watered, an ample supply of water being led through them by pipes from a large pump standage or lodgment on the upper level. The water that made on the 1300 feet level was used for watering No. 6 and 7 balances. The watering was effected by putting a valve on the pipe in each working place in No. 7 balance, so that a coal-box, holding a barrel, could be run under it and filled, and the orders were that it should be thrown on the roof and sides of the working places. Water was also allowed to run into the bords, and the shot-firers were instructed to see that the vicinity of the shot to be fired was damp. The amount of water available, and the directions for its use, should, in my opinion, have kept the stationary dust well damped.

The reports show that the workings in No. 7 balance were free from gas on the morning of the explosion, and the available evidence points to the fact that there was no lying gas up to the time of the explosion, as the brattice men who had completed their special work in other parts of the slope were killed by the explosion in the lowest bord of the balance on their regular rounds for the purpose of testing stoppings, brattice, etc. Evidence was given to show that the levels had been making gas for some time, but the air was good, and no accumulations were permitted.

From the evidence produced, the directions to the shot-firers, sulphur men, brattice men, etc., were proper, and carried out. There appeared in some instances to have been latitude allowed by shot-firers to miners in respect to charging holes before they were examined. In my opinion, when the supervision of shot-firers is considered necessary, no hole should be charged before it is measured by the shot-firer, and the amount of powder used should be subject to his opinion. I am the more inclined to this in reviewing this matter, as the evidence tended to show that the "flaming" shots referred to in the investigations were in some instances contributed to by a want of attention in placing the hole and the charges of powder.

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In the No. 7 balance locked lamps were used, except by the cage runner in the counter balance, who was allowed to use an open light. I do not know that this in any way contributed to the explosion, but would remark that it may be conceived that in the case of an explosion driving before it, and beyond its own sphere of ignition, a mixture of dust and gas, an open light might be instrumental in starting a second explosion. It is further to be remarked that the men employed who are furnished with locked lamps, are naturally inclined to be sceptical as to their value if they know that within a short distance open lights are permitted.

From the evidence taken it appeared that the manager Mr. Swift, who was killed by the explosion, his assistant, the under-ground managers, and other officials were careful and attentive, and that daily reports, and check reports were used.

In the No. 7 balance when the bords were first started, the coal was worked to its full height, having a bench of about 4 feet, then a stone band, and above that about 3 feet of coal. After the bords were driven in a short distance, the fall coal and stone was left in and the bench only was worked. This coal was not worked with powder, but as the face advanced it was necessary to blow down from 12 to 18 inches of the stone, to make room for the tubs to get near enough to the face to permit of their being loaded with coal. The stone was blown down in the low side of the bords, over the rails, and stowed in the high side. A row of props along the middle of the bords held the rest of the stone up. There was consequently little shot-firing done in the balance workings. The stone is about 2 feet thick, a coarse sandstone, with streaks of coal sometimes 2 inches thick. It was shown in evidence that usually the holes for the shots in the stone were bored in the coal streaks and were in some cases partly in stone and partly in coal.

It was shown that on the day of the explosion a shot was to be fired in this stone in the No. 3 bord in No. 7 balance, and that Thos. Wilson, the shot firer, left the bottom of the slope about a quarter past twelve o'clock, saying he had to go to No. 7 balance. The explosion occurred shortly before one o'clock, a time having elapsed in the opinion of the witnesses sufficient to have allowed him to reach this point, to have made the necessary preparations, and to have fired the shot. His body was found, with those of the men working in the bord, near the entrance to the place. The shot in the stone had been fired. This, coupled with the direction of the course of the explosion, showed with reasonable certainty that it had its origin in the bord, and that the shot fired by Wilson was the direct cause of the explosion.

The suggestion was made by Mr. Madden, the Deputy Inspector, who was at hand at the time of the explosion, and rendered valuable aid to the rescuing and exploring parties, that the immediate seat of the explosion was to be sought in the stone itself. After examining

the bord in question with him, I am of opinion that his suggestion offers the readiest explanation of the source of the catastrophe.

The bord is 14 feet wide, and the stone is carried by a row of props in the middle. These props were set by the miners as they advanced the face, to hold the stone, which was not of a specially strong character, consequently, as the stone was not blown down until it became troublesome to move the tubs, there were always props along the side of the shots, and between the shots and the face. The effect of these props was to partly confine the shots to the low side of the bord.

As the stone was in layers, and had streaks of coal in it, examination showed that it was more or less fissured across the bord, and hung on the props, the natural effect of the shots being to blow in along the layers, to compress the props and to cause the stone to bag between the props and the high side. That this effect was produced is shown by the fact that large quantities of this stone fell in the workings of No. 7 balance, the props being knocked out by the explosion, although very short, and partly supported by the stone stowed in the high side. The hole that was fired in No. 3 bord was, so far as could be estimated, from 2 feet 9 inches to 3 feet long. The end of the hole was in stone. The charge of powder appeared to have filled 18 inches of the hole. The shot threw down about  $\frac{3}{4}$  of the stone it was designed to dislodge, and left the balance split by the heel of the shot, and a prop near the back of the hole. There was a lype in the stone on the low side of the bord, which may have helped to lessen the desired effect of the shot.

The weight of evidence appeared to be that there had been an overcharge of powder.

It would appear that the expansion of the layers of the stone afforded space for the accumulation of gas, which would not be readily dislodged by the air current, and an unusual opportunity of accumulation, owing to the fact that the pit was idle the preceding day. That the shot gave evidence of having been a more or less flaming one; that it ignited the gas lodged in the roof stone; that this combination of gas and powder flame acting on an atmosphere charged with a small percentage of gas and fine floating dust derived from the lower bords, caused an intense flame sufficient to propagate itself until it reached an intensely explosive state and self supporting, swept the two balances and the adjacent levels.

The general opinion of the witnesses was that the shot firer was a careful man, and there is evidence that the explosion was not like that of a body of gas. Men working in the lower seam under the seat of the explosion, and separated by a few feet of measures, stated that as usual, they heard a shot fired above them. Then after an interval of a few seconds it was followed by a series of rumblings which appeared to shake the roof over their heads. The

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face of No. 3 bord inside the shot was found to be free from dust and sign of fire. The explosion broke only a few coal tubs, and did not do much more than dislodge the props. Almost immediately after the explosion men were able to go straight into the faces of the levels past No. 6 and 7 balances. Their lamps burned well, although they were themselves affected. These facts point, in my opinion, rather to the comparatively slow progress of a dust supported explosion than to the sudden clap of an ignited inflammable body of gas and air.

The evidence of Enoch Cox, who worked in No. 1 bord, on the same balance, supports this view. He testified that some time previous to the explosion a shot was fired in this stone, that filled his working place with flame, and ignited the gas in the stone, so that it required some effort to extinguish it. It is fair to state that the management declare they never heard of this, and that it was never reported to them.

In view of the evidence touching this lamentable accident, and the past experience of the Province in similar losses, I beg to submit to you that your honorable government would, in the interests of the safety of life, view with approval the enactment of legislation to the end that in all coal mines where gas is "reported" as found, the use of gunpowder or other explosive capable of igniting dust or gas be prohibited for the space of three months thereafter. That should such line of policy be approved of, it would be advisable to provide such means of joint report to your Department and the Management of each mine that you may be kept informed of the state of the workings. I also beg respectfully in this connection to draw your attention to the report of the Special Committee of the Legislative Assembly on the explosion in the Third Seam of the Acadia Coal Company, Pictou Co., during the session of 1888, and to my remarks on the fire at the Vale Colliery made to you in my report for the year 1889, pages 6 to 7.

In conclusion I beg to say that the inquest held by Dr. C. A. Black, of Amherst, was carefully conducted, and every opportunity given for the introduction of any evidence bearing on the subject. The jury, largely composed of practical coal miners, visited the district of the mine in which the explosion occurred, and took a deep interest in the examination of the witnesses. Their verdict, which was given after careful consideration, is as follows :—

The jury do say upon their oath that the late John Connorton and others came to their death by an explosion, which originated in No. 3 bord of No. 7 balance, in the west side of the east slope, on the 21st February, 1891.

They further believe said explosion was caused by the flame from a shot fired in said bord igniting coal dust and a certain portion of gas, which might have been present at the time.

They also believe that there was an unusual flame from said shot owing to a slip in the stone.



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They believe the explosion was accidental, that no blame is attached to the management, and that they have taken every precaution for the safety of their workmen.

The jurors do make the following recommendations :

First, that in future where safety lamps are used and in very dusty places, powder should not be allowed.

Second, they recommend that in gaseous portions of the mine before the men resume work after dinner, the places should be examined by competent officers.

Third, they recommend that the Local Government procure for the use of the Deputy Inspector of Mines a Shaw machine for testing gas.

Their recommendations are practical, and merit the consideration of your Honorable Government. In conclusion, I would remark that a committee of the men examined the mine previous to the explosion and found matters in a satisfactory condition. I append their report. Mr. Madden also examined the mine a few days before the explosion with the same results. I also beg to say that Mr. Maddin agrees with this report.

I beg respectfully to submit the above for your consideration, and remain

Yours obtly.,

E. GILPIN, JR.,

*Inspector of Mines.*

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I append a copy of the report of the committee of miners who visited the slope Feb. 19th :—

SPRINGHILL, 19th February, 1891.

To H. SWIFT,

*General Manager.*

Dear Sir:—We, the undersigned committee appointed by Pioneer Lodge to examine No. 1 Slope, in accordance with the law as contained in the Mines Regulation Act, beg leave to submit the following report:—

On entering the Mine at 6.40, a. m., were met by Mr. Conway, underground Manager, who accompanied us through the workings and principal airways, and we are pleased to state that the ventilation, as we found it, is all that could be desired, both in distribution and quantity, and the workings generally, we found in good condition.

The system of ventilation is such that it is almost impossible for gas to accumulate, even in the goaves, a sufficient current of air being carried through them to keep them clear.

In visiting No. 6 and 7 balances, west side, main seam, we found the place very dry and dusty, and in a condition, from the quantity of dust floating in the air, to make it a possible source of danger, which possibility, however, is rendered *nil* by a system of waterworks,

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carrying the water to each bord end, with a hose attached for sprinkling and damping the places. In fact, we found everything as aforesaid, in good order for safety and work.

Yours respectfully,

(Sgd.) W. D. MATTHEWS, } Committee.  
THOS. SCOTT, }

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SPRINGHILL, February 24, 1891.

### ACCIDENT SPRINGHILL.

*Investigation by Inspector of Mines under the provisions of the Mines Regulation Act.*

ALEXANDER MCINNES, sworn:—I am assistant manager here. The Mechanical Engineer can tell what the instructions to foremen are. The standing order was to increase it from 80 to 90 revolutions. I mean the fan. The reason for such increase was, we were going to sink to the deep. One means of keeping ourselves informed in the matter, is by the night examiners going into the fan house and examining the water-gauge, and by the examination of air by underground manager. The fan was running at usual speed, as far as I know, on Saturday last. I gave orders to increase the fan up to 100 revolutions after the explosion. There was no stoppage or partial stoppage of the fan on Saturday. I do not know of any lying gas in the mine, that is, previous to the explosion.

ANGUS MUNRO, sworn:—I am a fireman, and fan tender. I was at work all Saturday. I make it a rule to go into the fan house every half an hour. There was no irregularity in the running of the fan on Saturday, up to the time of the explosion. After the explosion I opened her up to increase the speed.

(Sgd) ANGUS MUNRO.

ALEXANDER MCINNES, recalled.—The smallest air way we have in connection with the air course is 60 ft. That is in regard to the intake to the bottom of the slope. The smallest air way we have in the west is 49 ft. That is into the head. The brattice is put up by two men appointed for that business who get their instructions from Mr. Conway, Underground Manager. I can hardly tell what their instructions are. David McGaveny, the head bratticer, was the man appointed to put up the brattice in 6 & 7 district. I have a general idea of how they do their work. I have never heard any complaints in regard to bratticing. I would have heard such complaints, if there were any. These men do nothing else but brattice work. That is their special duty as far as I understand. The ventilation in the pit for the last six week is generally better than during the last six months. The general condition of the pit is better for the last few years as regards gas, but I can tell more particularly in regard to the last

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year. I have had a pretty good knowledge of the East seam for the last 13 or 14 years. We have had no men burnt in the east slope since I was here, but I understand something of this kind had occurred when I was away. I remember of two specially large bodies of gas we met in the East slope, it was about the time the mine bord was flooded with water, that is as regards one body, the other was a back balance filled with gas shortly after we opened the 1900 ft. level. I cannot say if there was any special reason for the back balance filling, as far as I can judge the air must have been cut off. Those are the only two occasions on which large bodies of gas have been met. I understand men were burnt on two occasions when I was away. Mr. Hargreave's was Overman at the time McGaveney and Wilson were burned. No large quantities of gas have been noticed during the past year. It was uncommon for gas to fill place during the night I was not here when the 1900-ft. level was driven into its present place. The levels were quite a distance in when I was here. The levels have been driven in a couple of hundred feet further since I have been here. They stopped using powder in them about two months ago. We stopped for the reason they had no need of powder. In the main level, sometimes, it made considerable gas. I cannot say what arrangements Mr. Swift made about discontinuing the use of powder. We started with powder the last time. I am not aware of a blown-out shot in the mine in the low level since I returned, or at any time. Mr. Conway can tell you about the extension of the levels from No. 6 to where they stood. There were no flaming shots that I ever heard of in the mine bord in the new piece. I heard they ignited a feeder with an open light in the bottom since I returned. They used no powder since. A little gas was met when the bords were first started off in No. 7, and has been seen occasionally since. All the bords in No. 7 showed gas similarly to No. 1 balance. They were working with open lights when they ignited the feeder. No one was burned at the time by lighting the feeding. The bords in No. 6 balance at first showed as much as No. 7. I have not given any instructions to sulphur men since the first of the year. There are no written instructions given the sulphur men. I would certainly know if there were any complaints against the sulphur men. I did not hear complaints from the men. Charles Mitchell is the sulphur man.

CHARLES MITCHELL, sworn :—I am sulphur man in the east slope. My instructions are to examine all working places, and give a true report of the same to the Manager. I have to see if all the places are clear of gas-damp and falls. I do not confine my visits to working places. I have to go over west side of main seam. I have nothing to do with stony level. My work is all between the 1300 and 1900 levels. I have 8 hours in the pit. I go over the ground sometimes once, sometimes twice. I go over the inside part twice. I generally go through the mine when I first go down, and again about 4 o'clock in the morning in the inside places. There is another examination of the mine after my examination. I get through my shift at 5.30. The men go in on my report first. I cannot say who went around the mine after me on Saturday morning. Mr. Conway took it over from

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me on Saturday. The custom is for the men to get another report at the pit bottom from a man sent by Mr. Conway. When I went into 5 bord, 7 balance, I went into the face and examined it at the high side, out to the first lead on the high side. I would not examine the high side right out to the balance. I would do that in every bord. I would do that in 3 bord, 7 balance. I consider that from all the examinations I make of the places during the night there is rather more gas on the top bord of the balance. I would not find gas in them every night. There are no feeders in these bords. I have been acting sulphur man nearly two years. I am positive there would be no gas lying in these bords without me knowing it. I could not fix on one bord more than another as likely to be the seat of an explosion. I would think the top bord might be the most likely. I would be surprised if anything did occur by way of an explosion of gas in those bords.

(Sgd.) CHAS. W. MITCHELL.

ALEX. MCINNIS, recalled.—I suppose Thos. Wilson, the shot firer, would be the one to succeed Mitchell on Saturday last. I cannot say who examined the places in the mine after Mitchell, but suppose it was Thos. Wilson. The Manager appoints the shot firer. I select some and send them to the Manager for examination. My idea of a shot firer is one who is a good practical miner, understanding the nature of gas. They were always examined by Mr. Swift, who finally decided on them. I further think a shot firer should understand the roof and how to dig coal. I was never present with Mr. Swift at any of these examinations. I gave instruction to some of the shot firers myself. My instructions were first, in regard to firing shots, to examine the place carefully to see that there was no lying gas in the place before firing the shot, and if any gas was found in that place to fire no shot until air was brought in sufficient to clear that place, not to brush it out, and if no gas was found in the place, to see that the coal was worked properly, properly sheared, and the hole drilled satisfactorily to him; also, he has instructions in regard to timbering, to see that the place was properly timbered. He has no instructions to measure the hole. I never instructed him about the charge. He also examines places adjacent to the one where the shot is to be fired. He would not examine the bord above and below according to supplementary instructions I have just described. The Act says he is to examine adjacent places. I would not call the bord into the next place a "contiguous place." I understand on hearing the Act read that contiguous places would include the bord above and below. My instructions were supplementary to the Manager's. In my opinion the shot firer should examine the bord above and below. I do not know whether they were so instructed by the Manager or not. The shot firers are ordered to go back and examine the shot after it is fired. The Manager granted a permit to firers to fire a shot. I do not know what the instructions were as to the act of firing. They unlock their lamp to fire their shot. I know of no irregularity in shot firing in the mine. Nothing has been reported to that effect. My opinion of the best way in

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firing a shot would be a different method to unlocking the lamp. A better method is a heated wire. There are a great many methods which could be adopted for that purpose. In case of a misplaced hole the shot firer has the right not to fire it. We have had complaints of shot firers. One complaint was the men had to wait too long on them, and wanted to fire their own shots, that is, in naked light districts. Shot firers were put on here in 1884, I think. Only in certain places have all shots been fired by shot firers. We have open light districts now in the north slope. For the last few months no man was to fire a shot unless the shot firer was present. Never heard any complaints about the shot firers in any other respect. Joseph Maddison was one shot firer, and Thos. Wilson was the other on the east slope, in the morning shift. In the 2 o'clock shift Sam Russell and John Marden, and Richard McGraw in the 11 p. m. shift. There was no particular reason for having open lights in 6 balance and closed lights in 7 balance. Mr. Swift granted the privilege in 6 balance. He did not consider it safe for the men to fire their own shots. We do not consider it a good practice to mix lights that way in a district. I would not continue to mix lights in one district if I was laying down rules for a colliery. I was not here when Nos. 6 and 7 were driven. I was here when the bottom bench was taken out of No. 7. I think the explosion went up both 6 and 7 balances. If the gas had been fired at the face of the level it would cause an almost similar effect as coming from No. 7. There could be no derangement in the ventilation during dinner hour. The size of No. 7 balance, 10 ft. 6 x 7½ ft, and the opening at the top 4 x 6.

In answer to Mr. Drummond. The force of the explosion was greater in No. 6.

JOSEPH MADDISON, sworn: My occupation is shot firer. I have been shot firer 1½ years. I was selected as shot firer for the season. I was a fire boss previously. I was examined orally by Mr. Swift. I got instructions from Mr. Swift as to my duties. I got no instructions in writing. My instructions from Mr. Swift were that if there was any gas in a place I was not to fire a shot, or even in the vicinity of a place, no shot was to be fired, or if I had any suspicion of danger not to fire a shot, and to see that every place was properly worked for the shot, to be sure and examine the place thoroughly before firing the shot. I mean by a place being properly worked, that the bench is properly sheared. I had not to tell a man how much powder had to go in a hole. As a rule I always examined a hole before any powder was put in it. When I had any suspicion I measured the hole myself. I would not fire a badly placed shot. I had once to refuse firing one of these misplaced shots. This shot was too far into the high side. In certain places I would examine the face first and then I would go along the high side of the bord on the gob. I would not come back to the landing. If I found everything right I would fire the shot. I would hardly fire a shot in one bord if gas was in the next one to it. It has not been my practice to



examine places on each side of the bord in which I was firing a shot. I do not know how the other shot firers do their work. I have examined some places just before the men went in. I go into the pit about 6 o'clock. I get the report from the fire boss. I then go to No. 1 bord, then 2, then 3, and so on, brushing out the gas as I go, and then returning through the faces to No. 1 and report to the men. I always brush out to the first head on the high side. I don't consider it necessary to examine any other part of a bord outside the head. When I fire a shot, I light the squib with a match. No man is to fire a shot where closed lights are used. I never let a man fire a shot in such places. The rule is for the shot firer to fire the shot where closed lights are used. I never heard of any men firing a shot where locked lamps are used. I have not fired any shots on 6 and 7 balances.

(Sgd.) JOSEPH MADDISON.

CHRISTOPHER HARGREAVES sworn.—I am Underground Manager, No. 2 slope. Some time ago I was Overman in No. 1 slope. Mr. Conway was Overman in No. 1 slope when McLeod was burnt. I have the charge of sulphur men in my slope. They get their instructions from Mr. Swift and McInnis, but their daily instructions from me. I get a report from them at 6 in the morning in the lamp house. The men get their reports from the firemen too. If the night sulphurman reported to the men that all places were clear of gas, the men would start off to their work. *Explanation by Mr. McInnis.* The sulphurmen have instructions that in places where gas is expected, they have to make those places the last to visit. If a man found gas in his place, he would have to report it. He would not brush it out himself. The instructions I give shot firers are to examine all places in which a shot is to be fired and places contiguous thereto; to be very cautious not to fire a shot unless it is sheared 4 feet. I have never known of any blown out shots in Springhill. I left No. 1 slope in 1889. We have 2 bratticemen in No. 2 slope who do bratticing, and attend to the stoppings only. It occupies all their time. If there was gas in the lowest bord, the men would not be allowed to go in the higher bords in the balance until the lower bord was cleared. The workings in the stony level are under my charge, but the workings in 6 and 7 balance are under the charge of the Underground Manager, east slope. (Mr. McInnis here states the quantity of air in No. 7 balance is 9000 feet, and a little more in No. 6.)

(Sgd) CHRIS. HARGREAVES.

DAVID MCGAVENEY sworn.—I am a bratticeman, East slope. I was burnt in East slope two years ago. I got a clear report from bank before going in. We were driving the balance known as No. 5, 1900 ft. level. We neglected to examine for gas in the place before we went in: the custom was always to do so. We used open lights in the place. We always examined with a safety lamp. My comrade and I went nearly to the end of the canvass and got burnt. No explanation was given as to why gas was there. We got a clear report that morning. Charles Mitchell was sulphurman at the time.

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*Investigation resumed March 9.*—Since then I became a brattice-man. I have a year at that. My duties in that respect are to follow Mr. Conway's instructions, to put brattice up in places. I do this work in the daytime. I have been sent to put brattice up in places in East slope,—not in the morning, but through the day. I used to put brattice up in all the balances, both Nos. 6 and 7, when they were driving heads. Have not had to put up brattice to clear out gas in any places during the day during the past three weeks. Cannot say in what condition the bratticing was in the 6 and 7 balances on the Saturday morning of the explosion, as I had been off work for one week before that. Mr. Crawford was one of the men who did my work when I was off. He is now dead. Thomas Rogers was the other man. He is also dead. When I left off work previous to the explosion, there was no brattice in No. 6 balance with the exception of the head on the top lift of the balance; it was not considered necessary, as the heads had just been finished. There was no brattice in any of the bords in No. 7 balance, except in No. 6 bord. There was no gas in those heads. My duties take in nothing else but bratticing. My instructions are given me every day in a general way by Mr. Conroy or whoever else is in charge. I was once called during the day to remove gas in No. 7 balance; it was in a head in No. 1 bord, with about 1 ft. of gas in it, some three months previous to the explosion. Cannot form any opinion as to the cause of the explosion. In the main and low levels it was always clear when the brattice was kept up to about 5 ft. of the face.

(Sgd.)      DAVID MCGAVANEY.

CHRISTOPHER HARGREAVES, re-called:—At the time when this explosion occurred,—I mean when McGaveney and Wilson were burnt in July, 1889, I had leave of absence for two days, and had only been in the pit half an hour when it happened, and had had a report that McGaveney's place was clear. McGaveney's place had worked shifts between the time I went away and when I came back. Mitchell, the sulphurman, made the report to me that McGaveney's place was clear. I saw Mitchell mark on the face of the balance 15 minutes after the explosion. I found some of the brattice deranged at the bottom, on the level, a piece of it was down. During the time I was in the east slope, and at the time when the water was in, there was an accumulation of gas in No. 2 balance 1900 level; that was about three years ago. There always seems to be more gas on the west side of the East seam than anywhere else I have had charge of. The heads between the mine and main level are from 50 to 60 ft. apart. I get my instructions from McInnis now, but previously from Mr. Swift. I have men working with safety lamps now in the west slope. I do not give safety lamps to strangers, but put such in places where naked lights are used generally. I have largely to depend upon what new men tell me themselves about being acquainted with the use of safety lamps. I have never known of any blown out or flaming shots in this mine. I have not formed any opinion about this explosion. I would not care to express an opinion.

(Sgd.)      CHRIS. HARGREAVES.

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JENKINS MORGAN sworn :—I am lampman at East slope. My instructions as a lampman are : I commence my day's work at 7 A. M. The lamps for day shift have all been given out when I go on. The first thing I do is to clean all the lamps that have been out in the 2 back shifts. I have no re-lighting to do ; that is done at the bottom. I clean all lamps and see that they are all right that come up in the day shift. The lamps we principally use are the Marsaut and a few Clanny's. The Marsaut lamps alone are used in East slope. I can identify all lamps that come in. They are all numbered to correspond with men who use them. We very seldom get any broken or damaged lamps. About half dozen gauzes have been spoilt with picks since I have been here. I have been here a little over a year. I have seen some of the lamps which have been brought since the explosion ; there are 28 yet missing. None of the lamps received since the explosion were unlocked. We have received about 17. I have had ten years' experience in lamp cleaning. I am head lampman in this colliery. There is a lampman at each slope. We use Miner's safety lamp oil. I think it a good oil so far as I know. The firemen, when they come up from the pit in the morning, try the lamps when they are given out to the men. I have never known any other way of testing the tightness of the lamp other than what is used here. Witness then described a method of testing lamps in a gas box at the Glamorgan Coal Co., South Wales.

(Sgd.)

JENKIN MORGAN.

ALEXANDER MCINNES, recalled.—When a stranger comes into the mine who knows nothing about mining he must always serve a certain number of years as a loader before he is allowed to cut coal, but in the case of a stranger who claims to have a knowledge of mining, he is generally put with a practical miner until the officials can see if he has the necessary qualifications of a miner. When a new man who desires work as a loader, a stranger to mining, applies for work, we do not at once send him into a gassy place. I should think two years the shortest time a raw man coming here as a loader would get the picks. As near as I can remember Mr. Conway's statement last night in regard to the connection between 5 workings and No. 6 balance, are correct. It is not at all probable that any man working in No. 6 balance would go to this No. 5 as it was a considerable distance away. Supposing there had been gas in No. 5 workings and that a fall had caused it to light on No. 6 balance, the resulting explosion would have been different in its effects from the one we have had, in this respect, it would have destroyed the connections of 5, 4, 3, 2 and 1 with the main level and would have damaged the main level much more, it would probably have destroyed the East Slope. I do not think the gas which caused the explosion came from No. 5 workings. My reasons for saying this are, that we have never found any gas there, and for the reasons I have already given. The fact of Nash being burnt 200 ft. up No. 8 balance at the face of the broken by a flame which came along the main level, is a pretty fair test that there was no gas in that part of the goaf at all events. There was no danger board between No. 5 and 6. There have been no com-



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plaints lately of men opening their lamps; last year some men were discharged for this offence. My instructions about travelling these old workings were that they were to be travelled 3 times a week and examined as far as practicable. I went occasionally myself when I had time. Conway generally reports when he examines, and the men appointed by him report to him. Conway was responsible for the watering of 6 and 7 balances. Sometimes I have found these balances a little dusty, but I consider the system of watering good. When I found any places dusty, I gave orders to have them watered, if necessary, before any shots were fired. I ordered the water pipe to be run down No. 7 balance, and the branches into each bord. The same plan was afterward adopted in No. 6 balance. No. 6 balance was worked for some time before it was considered dusty. We have checks in our airways and returns. I did not know there was one open light used by the cage runner in No. 7 balance. I knew that the shover-on at the bottom of No. 7 had a naked light. In some cases the men made considerable objections to the introduction of safety lamps into the Colliery. I do not know anything of the position in which Wilson's body was found. As far as I know all the chargemen in the East slope carried out their instructions and did their duty faithfully. In cleaning up in 6 and 7 balances so far as we have gone, nothing has been found to throw any light on the explosion. In my opinion the explosion was not caused by gas alone. It is not hardly possible that the slant door near where Swift's body was found, was left open at dinner hour on the day of the explosion. I hardly think the explosion was caused by dust alone. I don't think any unusual occurrence in the working of the mine caused the explosion. I think the explosion occurred somewhere near the centre of No. 7 balance. (Sgd.) ALEXANDER McINNIS.

WILLIAM MCGILLIVRAY sworn.—I am rope examiner, east slope. I was in No. 7 balance about 11 o'clock on Saturday morning of the explosion. I examined the ropes. There were no shots fired there then. I examined the ropes in 6 balance, also the little balance previous to this. I carried a naked light. I was the only man in No. 7 balance except the cage runner who carried a naked light. I left there about 11 o'clock. I noticed nothing wrong there. I heard no complaints. I was watering that balance (No. 7) the day before. After leaving No. 7, I went to the other side of the pit and returned to the cabin of the east slope for my dinner at 12 o'clock. I saw Wilson about 12 o'clock. He said he had to go to No. 7 balance. He left the cabin about 12 o'clock. As I went in he went out. I was in the oil cabin when the explosion took place. I think it occurred about a  $\frac{1}{4}$  to 1 o'clock. The pit had started before the accident happened. I think it would take Wilson about 10 minutes to walk from the cabin to No. 7 balance, and about 5 minutes more to get to the face of the bord. I saw Mr. Swift leave the bottom about 12 or 1. I cannot remember who else was in the cabin when Wilson left it. There were several men with me on Friday watering in No. 7 balance. We splashed it all around, up in the gob and in the heads and had it all wet. We used about 3 barrels in each bord. We left

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a full barrel of water in each bord. We tried every bord on that day (Friday) for fire damp, and found everything clear. We had safety lamps. I think No. 7 balance had been watered on the Tuesday previous. When we watered it on Friday it was not "awfully" dry, it was dryest in the gob. After being watered, I don't think it would require it again for two or three days. I never heard any men on that balance say they were frightened of an explosion. I never said to any one myself that I was afraid of an explosion. I considered the place safe. I have travelled that section of the mine since the explosion. I think the explosion came from No. 3 bord, as Wilson's body was found there. I have not had much experience in dusty places besides this.

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Witness R. B. MURRAY, (Sgd.) WILLIAM X MCGILLIVRAY.  
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MALCOLM MCLEOD sworn:—I am a miner. I was burnt in the 1900 lower level west side East Slope on or about the 20th December, 1889. I was on the afternoon shift, my brother, Jno. McLeod, was on the morning shift. We struck a trouble, it run right across the face altogether. I was the first one fired a shot after we struck this stone. The hole was bored between 2 stones, in about 6 inches of coal between 2 bands of stone. The shot firer, Yarrow, came in; he fired the shot. We ran out about 150 feet from the face. I was standing on the high side, the shot went off and in a few seconds the flames came out—I thought from the pavement to the roof. I threw myself on the pavement of the high side, and I think Yarrow and the loader were thrown down. We were working with naked lights. We never set fire to any gas feeders with the naked lights previous to that shot. I had my arms burnt and some few blisters on my face and ear from the shot. The place was middling dusty, the air was good; there was no fire except the canvass had caught; the shot did its work. Yarrow examined the hole before firing it. I have never worked in that place since. I was working in the place for about five months before this. I never noticed any feeders except once or twice. Feeders caught from firing a shot, but not from a naked light, had no trouble in putting it out. When I was burnt, I did not notice any gas; there was little change from the time I went in until I was burnt. I always worked with a naked light there. I have worked in fiery pits before this. I was not up in No. 6 balance at all. The place I worked in compared favorably with others as regards dust. I used damp coal for tamping the shot that went off in my place when I was burnt.

(Sgd.)

MALCOLM MCLEOD.

JAMES FERGUSON, sworn:—I am a shiftman in east slope. I was putting timber on the day of the explosion down through a head into the mine bord. The opening was 11 inches by 9 inches. We were not in the habit of putting timber down there previous to that day. This was the first timber went that way. The timber was about the same size as the opening. The hole was cut purposely to take the

timber down. I made the hole myself. Mr. Conway did not order me at that time to make the opening. Mr. Swift made the order.

WILLIAM MURRAY, sworn:—I am timekeeper in east slope. I was in the cabin at the bottom of east slope at the time of the explosion. I saw Mr. Swift at the bottom at 12.25 before he started in. He asked me if I saw Mr. Reese. I should imagine the explosion took place about ten minutes to one o'clock. The last time I saw Thos. Wilson was about a quarter to nine in the morning. When I saw Wilson he told me to tell Conway that everything was all right. I do not know the size of the hole at the bottom of the east slope that was being used to take timber down; they were closing it as I came past. I was in the habit of going through 6 and 7 balance every day. I was in them on Friday before the explosion. I saw the men watering there. I don't remember having any conversation with the men who were watering. Have never heard any report of the state of these workings. Have heard them reported as dry, and Mr. Conway ordered them watered. I have not had much experience of mines.

(Sgd.) WILLIAM MURRAY.

JAMES FERGUSON, recalled.—There were two stoppings, one at the top and one at the bottom of the mine bord pillars; when we were putting the timber down the hole at the bottom stopping was closed. After the timber was put down the top stopping was closed by canvass. The explosion had only a little effect on the bottom stopping, but blew out the canvass which we put in the top stopping. The opening in the bottom stopping was between 2 and 3 feet square. I was at the bottom of the slope at the time of the explosion. There was only a little air drawing up through the hole before the explosion. I don't remember seeing Thos. Wilson, the shot firer, at all that day. I saw Mr. Swift, and spoke about the timber. Mr. Swift left me about 12.25 p. m. I think the explosion took place about 12.40. I was at the bottom of the east slope at the time. I saw no fire. I was not near 6 or 7 balances on that Saturday morning. I had not been there for over a month. In my opinion, if the hole in the stopping had been left open, it would not have affected the air in the west side in any way. The top hole had been cut on Saturday morning. When working in front of the hole, as a matter of fact, the air was coming up, what there was of it. James Welwood and Dan O'Brien were working at the timber with me.

(Sgd.) JAMES FERGUSON.

RODERICK MCPHERSON, sworn:—I am a shiftman in the east slope. I was in the back seam at the time of the explosion; was in the cabin about 12 o'clock. Thos. Wilson was there; he left the cabin about twenty minutes past twelve; he said nothing particular about where he was going. I saw Mr. Swift at 11.30. I did not see him after that. I had gone into the other seam before he came down. I cannot say exactly at what time the explosion occurred. I did not see

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any fire. It would take a man about 20 or 25 minutes to go from the cabin to No. 3 bord No. 7 balance. I did not see the hole before the explosion referred to by James Ferguson.

(Sgd.) Roderick McPHERSON.

JOHN F. McDONALD, sworn:—I am a miner. I was working in No. 6 balance since the "strike" up to a day or two before the explosion. No. 6 bord was in about 100 ft. when I commenced to work in it. Wm. McKee was with me. When I started there I thought the place was in good condition. It was quite dusty for the last while. I did not take much notice of dust when I first started. The place was calculated to be 12 ft. wide, and the height about 8 ft. I considered the place was getting dryer and dustier lately. To my knowledge the dust was never watered in that balance (No. 6) until a short time ago. I cannot say when they watered the bord. I don't think it was considered necessary to do so until lately. We had a peculiar shot in that bord some time ago. We had a bench about 8 ft. long; we had a trouble on high side of bench, which brought a "lype" in, and so to catch both the low and high sides of the bench, we bored to try to cross the "lype." The hole was 4 feet long. I put  $2\frac{3}{4}$  skips powder in the hole, the shot firer lit the squib and we all three walked out together. The shot went off and made a very sharp report and quite a flame. It gave us quite a start, and when we turned about we could see the fire in at the face; it died out in a second or two. The conclusion I came to was the powder came up through the lype; the flame came back about 20 feet from the face. The shot firer examined the place carefully before he lit the shot; he said it was clear of gas. In conversation with him after the shot went off, he told me to take the sulphur lamp with him and come into the face; there was no fire left. The shot firer said, had there been a little gas there, there would be apt "to have been an explosion." After that we were not allowed to use any fire there until the place had been watered. I did not think it dangerous to use powder in that bord. We had a little gas in the place at times when I worked in it. I only saw it once. Some six or seven weeks previous to the shot being fired, when I tried the place with my safety lamp in the high side, I put my lamp against the roof before I noticed any fire damp in the high side corner. I drew back my lamp and tried again and could not find any. When I found no gas in the place I went to work. I don't remember if we fired a shot that day. We have seen no gas in the place since then. My opinion is that the explosion was caused by the shot fired in No. 3 bord No. 7 balance. I never had any trouble with the firemen and shiftmen or other officials in the mine. I think they were doing their duty. Mr. Conway came in after he got the report from the shot firer and examined the place. I have known of flaming and blown out shots in this mine in the past. I can't say they were in dry places.

(Sgd.) J. F. McDONALD.

WILLIAM CONWAY, of Springhill, in the County of Cumberland, being duly sworn, said:—I am underground manager East slope. I

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get information in the morning from the night firemen what places most require brattice, then when I go down the pit I give my orders to McSaveney to proceed to the place most requiring it and fix it up, and after he gets the places most required fixed up, to take a round and have all places properly fixed whether it takes overtime or not, but have everything fixed before he goes home; and if there are several places requiring brattice at the same time, I send assistance with him. We have very seldom to do this, as the brattice is generally well kept up. These bratticemen have always done their duty well. We have seldom been called upon during the day to put up canvas to take out gas. We never had any large accumulations of gas during the last six months. On 23rd Dec., 1889, when Malcolm McLeod was burnt in the low level, the pit was in charge of George Yarrow, who was back overman, and who fired the shots. It happened about 7 o'clock, P. M. I know that place was canvassed to about 7 feet of the face, and that about 10,000 feet of pure air was dashing against the face. George Yarrow is now in British Columbia. It was in a trouble; the hole was in a small dirty seam above the regular seam; the hole did its work very well. The canvas was burning in the place after the shot was fired. I supplemented Mr. Swift's instructions to sulphurmen to be very careful. They examined the old workings in the 1900 ft. level. The old balances were travelled three times a week, which made nearly a daily examination of the old workings; and in addition to that, as much of the "goaf" as possible was examined by me once a week. I also examined the "intakes" and "outlets" of those places (balances) mostly every day, sometimes there were records kept of those examinations. Gas was never found in them. The shot firers got their first instructions from Mr. Swift. The orders that I gave them were to see that their benches were well sheared, and that their holes were not to be within two feet of the high side rib, and that they had to go parallel with rib and not to dip or grip the bench, and to see that the hole was not bored within a foot of where the shearing was done, and if they found any gas "cutters" about, not to fire the shot until I examined the place myself, and as they went around the bords to see that the men had timber, and any men that were lacking timber to report to me, and to let me know at any time if there was any accumulation of dust anywhere in their travels. I first began to give these instructions about the dust after Yarrow and McLeod were burnt. Whenever they (the shot firers) saw any broken timber or canvass required in any of the places they were travelling through, to let me know immediately. I gave instructions to them to see that the holes were not in the solid. The holes were never charged until the shot firer got there to my knowledge. I never saw a hole charged waiting for a shot firer. The shot firers have sometimes come to me with complaints that certain places were getting dry. I think Tom Wilson refused to fire a shot on account of the dryness of the place, but it was according to my orders. I do not remember the bord. I think it was in No. 6 balance, west side. That was not very long ago; we watered the bords shortly after that. In No. 2 bord, No. 2



balance, back seam, Donald McKay and Allison bored a hole about  $2\frac{1}{2}$  feet from the rib and run it up towards the rib. We made them cut that hole out. The hole was charged and not allowed to be fired, but was finally cut out. I have known of one shot to flame out in the west counter level seam; the bench was well sheared and the hole was started  $2\frac{1}{2}$  feet from the rib in front and run back until it got about 18 inches from the rib; the bench was about 2 feet 9 inches in front, and about 3 feet 9 inches in the back; it would gain a foot in. There was a large amount of air going into the face direct from the west slope fan, but there was a balance driving between the down cast and the face of that level, that made considerable dust. They fired the shot and it set fire to the canvass. The place was canvassed up to about 8 feet of the shot. The canvass was fired back 6 or 7 feet. The explosion took place about 10 seconds after the shot went off. I suppose the explosion was of dust; there was no gas that could be detected with a Davey lamp. I was in the place about 10 minutes after the explosion. I heard the shot, also heard the explosion following it. I went as soon as possible into the place and examined the hole, and found it hot and all about it for about a foot on each side hot also. Mr. Swift came in about 10 minutes after I did. I found the shot had overdone its work; my reasons for supposing so were, that the coal was all cast up and lying down at the low side instead of being in large lumps. I think it was the flash of powder set fire to the canvass; the canvass next the face was the heaviest on fire. That place at the time was dustier than 6 or 7 balances before those were watered. After that we watered the counter level and sowed large quantities of salt along the counter level and main level as well. I never gave the shot firers any instructions to gauge the amount of powder to be put into a shot. The shot firer told me that he had measured the hole, and did not consider it was anything wrong, but it had got 8 or 9 inches nearer to the rib than he expected. Joseph Madison was the shot firer. I knew of one flaming out shot in the 6 balance, west side, main seam. Thomas Wilson came to the cabin and reported to me, i. e., about 9th or 10th Feby.: "I have fired a shot No. 6 bord to-day, and there was quite "a bit of flame from it." I asked him if he could tell me the reason. He said he could not tell whether it was powder or dust, or if the hole which was bored getting a little into the pavement in the stone in the back end of the hole. He had examined the place closely and found that the hole had been bored almost all the way in a "lype," and this "lype" slanted up through the bench towards the high side, and as near as he could judge the powder came out that "lype" and flashed against the roof and made quite a lot of sparks for about 15 or 20 ft. back from the face. He immediately went into the place and found it very warm but no smoke. I went immediately into the bord and examined the shot and questioned the men who were working in the place, and found by their evidence, and the evidence I saw of the "lype," that Thos. D. Wilson had told me the truth. The men were working when I went into the place, and everything was quite cool

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and comfortable. That would be about half an hour after the shot was fired. We were watering those places at that time. I consider the "lype" being there caused a weakness immediately over the shot which the men couldn't discern. The shot in other respects was well worked and well laid out. I was not through No. 7 balance, 1900 ft. level, Saturday morning of the explosion, but I was in to the foot of it on the level and there saw evidence of the drenching it had got. The water was running down the balance and could be seen all around the cage hole. I turned back from the foot of No. 7 balance and went up No. 6 balance to the "stony level," going through 1, 5, 6, 7, 8 and 9 bords on my way and 1 and 2 bords east on the little balance. That would be coming on pretty well to 10 o'clock, a. m. The workings in No. 6 balance were in a good state; all around the landing at the foot of the little balance was thoroughly drenched with water. Powder smoke was coming out of No. 6 bord. Young Chandler, the cage runner of little balance, was standing on his cage. I asked him "who fired?" He said, "somebody in there because the smoke is coming out." I went in to the face of No. 6 bord. Wm. Kee and his loader was there. I said to him "you fired your shot." He said "yes" and it did grand." I went and examined the shot and found it a good one. My reasons for examining the shot were to see if I could find anything similar to the condition that prevailed when there was a flaming shot known in the same place. I made the remark to "Kee" that the bord was pretty well drenched from the landing in. He said he considered it was good all over and nothing could happen to it now. There were no shots fired in No. 6 but that one that I know of that day. I came back to the landing of No. 6 bord and went down to No. 5 bord where Miller and Shipley, two shiftmen, were watering that bord that morning. I saw them working and gave them full instructions what to do. That morning I told Thos. Wilson I would leave the mine about 10 o'clock and for him to try and report to me if his section of the mine was in its usual condition. I told him I was going up No. 6 balance and for him to try and meet me there. After giving my instructions to Miller he told me that Wilson had told him to tell me that everything was all right throughout his district. I then went up to No. 6 bord and passed it again and went in to No. 1 bord east little balance. I came from there and went to No. 2 East, then went to head of No. 6 balance to the Stoney level to see how water pipes were working; then returned from No. 6 balance and crossed over to No. 8 bord west little balance, and went into face of bord; then returned and went into No. 9 bord, and from there up through a head to the Stoney level and saw Jno. McDonald there and gave him some instructions. On the Stoney level I met Messrs. McInnes and Hargreaves. After talking with them, I concluded to walk up the West Slope travelling road as I wished to see it. I then left the pit by the West slope travelling road. In my opinion, the putting through this head in No. 6 would not affect the air in No. 7 balance. No. 1 bord of No. 6 balance was in a very good state and watered when I got there. All Thursday night there was a stream from a 1-inch pipe running

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through 1, 2, 3 and 4 bords. The bords 7, 8 and 9 in top balance were damp; they were naturally so. The connection between the workings of 5 and 6 balances is a continuation of No. 5 bord; through to the backhead of 6 balance the head is open. Some air passes from No. 6 over to No. 5. There is no connection between the backhead of 6 balance and the workings of 5 balance, between the main level and the No. 5 bord of No. 5 balance. None of the men who were working in No. 6 balance would be likely to go to this opening into No. 5. That morning (Saturday) I got a report that my canvas was all right, except that the west level back seam required canvassing most. I gave Crawford orders to go and canvass it in good shape, and also to see if the counter level required any. There was never any flaming shot in No. 7 balance. We found little "cutters" in the mine bord, and stopped the powder there. I do not remember if we had any "cutters" to fire from a shot in that level. The levels and mine bord have been shewing more or less gas ever since I went into it, but it is quite a while since gas has been shewing to any extent. We stopped open lights in No. 7 balance shortly after starting the bords. We had locked lights in No. 6 balance at one time, and then did away with them. Regarding orders to Crawford for canvassing, I gave him his orders to go into West level back seam and examine counter level, and then come to East level main seam and have it properly canvassed up wherever required, and from there to the mine bord on the west side of main seam, and to canvas everything up from the mine bord up to head in No. 7 balance. Crawford and Rogers' bodies were afterwards found in No. 7 balance.

WILLIAM CONWAY, recalled.—The cage runner on No. 7 balance was running with a naked light; he had a safety lamp as well. The reason for that was, when one of the miner's lamps is out, he (the miner) got the cage runner's, until the extinguished lamp was sent out to be relighted. The safety lamp was not given to the cage runner as any matter of precaution. The shover on at the bottom of the balance had a naked light. The driver boys on the main level did not go inside the turn-out of No. 7 balance. The men shoved the coal out to this point from the face. The driver boys went with their open lights as far as the bottom of the shunt, where there was a "danger board"; from that point to the face they used locked lamps. It was about New Year's when Wilson refused to fire the shot in No. 3 bord of No. 6 balance. Watering dusty places commenced in mine about a year ago in No. 6 balance. We started to water No. 7 as soon as we commenced to drive it. After No. 7 balance was through on to stony level, No. 6 got damper, and was only watered when any particular place appeared dry. There were about three shots each day fired in No. 7 balance in the stone. We used powder in the bench only in No. 6 balance. The stone in No. 7 balance is from 14 to 22 inches thick. There would be about  $4\frac{1}{2}$  feet of coal above that. I feel convinced that the origin of the explosion was from No. 3 bord of No. 7 balance. I think the hole was charged with too much powder, and when the shot was fired the flame



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came rolling out and met the air charged with dust coming up from the head, which set off the explosion. I think the explosion was entirely due to dust. There was no gas in any of those places that we could detect with a "Clanny" lamp. There was no evidence of any explosion coming from No. 5 towards No. 6. There was no gas in No. 5. I don't think No. 5 workings or the old "goaf" had anything to do with the explosion. Watering in levels commenced in the mine ever since we found dust in them, and considered it dangerous. To shew that the men in No. 7 balance considered the precautions we were taking as being over-reaching, whenever I went into that balance some or several of the men used to ask, "When are you going to give us back the naked lights?" and more than that. I went through that balance on Thursday before the explosion with a committee from Pioneer Lodge, consisting of William Mathews and Thomas Scott, both holding underground managers' certificates, who were making an inspection of the mine under the provisions of the "Mines Regulation Act." After going through, they congratulated me on the safety of the mine and the general conduct of it.

(Sgd.) WM. CONWAY.

*Summary of evidence of Enoch Cox and others, given before Dr. C. A. Black, Coroner.*

I was at North Slope when explosion happened. I worked in No. 1 bord No. 7 balance two weeks before explosion. Air good in that bord I saw gas in bord. Worked there about four months. When I started bord was in 22 feet, full height. I drove it 20 feet further, full height; then cast on top coal and stone. Saw no gas after that. When I got report of gas in my bord at surface, I then waited at foot of balance till place reported clear by shot firer. I have been cautioned that when I then went into my place I might find gas there, and if so to brush it out. I have so found gas after waiting at foot of balance some time after the place was reported clear by shot firer.

Shots in the stone are usually four feet long, and take 4 to 4½ skips of powder. I have charged holes before shot firer came. Shot firer always examined for gas, and never found fault with my shot hole or charge. Place was satisfactorily wetted. Did not fear dust; considered it well damped. Before New Year's Wilson fired shot which flamed out 40 feet, and it took four buckets of water to put out the fire around the hole in the stone. The fire was burning in the roof over the shot in the stone. The rock did not fall and had to be cut down. I do not know if this flaming shot was reported or not.

[NOTE.—Management say it was not reported.]

R. DYKENS.—Had peculiar shot in counter level going west in the back seam. Hole was bored, shot firer waited until the shot was ready, and fired it after examining the place for gas. Fire

blew out and rolled toward us. After flame subsided, we went in and found edging of canvas brattice burned, and small feeder in the fall also burning. Fire was readily put out. Place was dusty. The flame was about forty feet long. Gas had been reported here several times, and shot firer had twice refused to fire shots, as he considered he had evidence of presence of gas.

WILLIAM CONWAY.—In No. 7 balance when blowing down the stone, about half way in the band (about 24 inches thick) there is a seam of coal  $\frac{1}{4}$  to 3 inches thick. The holes were bored in this seam by hand punch—and a drill was used when the seam was thin or the hole got in stone. Drills were provided for the work.

SPRINGHILL, N. S., 23RD MARCH.

*To the Honorable*

*The Commissioner of Public Works and Mines,*

*Halifax N. S.:*

SIR,—In pursuance of Chapter 8 of the Revised Statutes, "Of the Regulation of Mines," I beg to give you notice that an explosion has occurred at this mine, of which the following are the particulars:

Place where the accident occurred:—

In Number One slope, supposed to have originated in Number Seven balance. Date of accident, twenty-first February, 1891. Character of accident—explosion, supposed to have been caused by a blown out shot igniting coal dust.

The following is a list of the killed and injured:

#### PERSONS KILLED.

<i>Name.</i>	<i>Age.</i>	<i>Persons dependent on him.</i>
Anderson, Arthur.....	17.....	
Armishaw, Jesse.....	21.....	
Armishaw, Herbert.....	18.....	
Boyd, John.....	27.....	Wife.
Bentliff, John.....	39.....	Wife and five children.
Brown, William.....	19.....	
Brunt, Andrew.....	19.....	
Brunt, Alexander.....	15.....	
Bond, George.....	18.....	
Birchell, William.....	22.....	
Budd, Alonzo.....	27.....	Mother.
Banbridge, Ernest.....	25.....	Mother.
Chandler, Ernest.....	16.....	
Campbell, Donald.....	47.....	Wife and seven children.
Campbell, Alexander.....	25.....	
Campbell, John D.....	24.....	
Carter, Clarence.....	23.....	

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**REPORT**  
**OF THE**  
**DEPARTMENT OF MINES,**  
**NOVA SCOTIA,**  
**FOR THE YEAR 1891.**

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HALIFAX, N. S.:  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.  
1892.

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# DEPARTMENT OF MINES.

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## REPORT FOR THE YEAR 1891.

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*To His Honor MALACHY BOWES DALY, Esquire, Lieutenant-Governor  
of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,  
*Commissioner of Public Works and Mines.*

HALIFAX, *March 3rd, 1892.*



# REPORT

## ON THE

# MINES OF NOVA SCOTIA,

BY EDWARD GILPIN, Jr., A. M., F. G. S.,

Fellow of the Royal Society of Canada, Member of Canadian  
Society of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, *March 1st, 1892.*

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,  
*Commissioner of Public Works and Mines :*

SIR,—I beg leave to submit the following report on the Mines of  
Nova Scotia, for the year ending December 31st, 1891.

The following summary shows, so far as I have been able to learn,  
the mineral production of Nova Scotia during the year 1891, compared  
with that of the previous year :—

		1890.	1891.
Gold .....	Ounces..	24,358	23,391
Iron Ore.....	Tons....	55,191	57,311
Manganese Ore .....	" .....	266	41
*Coal raised .....	" .....	1,984,001	2,044,784
*Coke made .....	" .....	36,738	34,148
†Gypsum .....	" .....	146,003	161,934
‡Grindstones, etc.....	" .....	8,385	19,800
†Moulding Sand .....	" .....	170	230
†Antimony Ore.....	" .....	26	10
Limestone .....	" .....	35,000	18,000
Copper Ore .....	" .....	1,000	900

Through the kindness of the Collectors of Customs at the various  
ports of the Province, I am enabled to give further details under this  
head at the end of the report.

\* Ton of 2240 lbs.

† Amount exported.

‡ Value in dollars.

I also give as an appendix a summary of the amount of minerals produced not paying royalty.

I beg leave also to submit the reports of W. Madden, Jr., Esq., Deputy Inspector for the County of Cumberland, and of P. Neville, Esq., Deputy Inspector for the Island of Cape Breton. These gentlemen have repeatedly visited the Coal mines in their respective districts, and have as usual rendered valuable assistance to the department. Mr. Maddin, in addition, visited a number of the Gold mines during the summer and fall.

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## COAL TRADE.

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The returns show a sale during the past year of 1,849,945 tons against 1,786,111 tons during the preceding year. The increase was not as large as anticipated in the spring, and the explosion at the Spring Hill collieries, reported on in the report for the year 1890, reduced the output of Cumberland County by about 30,000 tons.

As compared with the sales of the year 1890 the most noticeable points are:—

The home sales were 639,737 tons compared with 601,956 tons in 1890.

The Province of Quebec took 775,286 tons against 751,931 tons in 1890.

The sales to the United States were 2585 tons of round, 58 tons of run of mine, and 22,788 tons of slack coal, in all 25,431 tons, as compared with 50,854 tons in 1890.

The sales to Newfoundland, New Brunswick, Prince Edward Island and other points show little difference.

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### CUMBERLAND COUNTY.

The sales of the county were 462,267 tons against 438,608 tons in 1890.

The production of the collieries of the Cumberland Railway and Coal Company was 459,395 against 419,012 tons in 1890, in spite of the delay caused by the explosion. Since that date the enlargement and completion of the air-way has been finished. New pumps, screens, etc., have been put in, and the colliery generally placed in excellent order. Safety lamps alone are used underground and no explosives.

The Chignecto mine has remained closed, and no returns of a satisfactory character have been received of the results of the prospecting carried on for other seams.

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A little work has been done on the Maccan River collieries by Mr. Smith and others. Mr. Sharp of Amherst, and others, have traced the Styles seams further to the east, and added materially to our knowledge of this part of the district.

At the Joggins mines the system of long wall has been continued, and improvements made to the railway and wharf. The output was 60,056 tons.

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### PICTOU COUNTY.

The sales were 405,096 tons as compared with 430,509 tons in 1890.

The home sales were 265,098 against 277,753 tons in 1890.

The Province of Quebec took 63,219 tons compared with 90,461 tons in 1890.

The output of the Acadia Company was 286,372 tons, and of the Intercolonial Company 140,728 tons. The Black Diamond Colliery was purchased by the Acadia Company, which will continue the extraction of the pillars, etc.

At the Albion Colliery the work of re-opening the Ford Pit has been continued with success.

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I submit herewith the report of Mr. Madden on the Collieries of Pictou and Cumberland Counties, during the past year:—

WESTVILLE, N. S.,

31st December, 1891.

E. GILPIN, ESQ.,

*Inspector of Mines, &c., &c.*

DEAR SIR,—I beg leave to send you herewith a condensed statement of my official work as Deputy Inspector of Mines for the Districts of Pictou, Colchester and Cumberland, for the year ending 31st December, A. D. 1891, including also a report on some of the Gold mines of the Province I have visited officially during the same period.

### INTERCOLONIAL COAL MINING COMPANY, WESTVILLE.

The principal work in this mine during the past year has been extracting the pillars on the 3000 feet lift; on the north side the pillars have been very satisfactorily drawn, and all the plant from that side taken to the south side. A large proportion of the work done was in the S. Holmes area, in which they are successfully mining a large per centage of coals. There are yet, however, on their own area, a block of coal, 450' × 1800', standing with (4) four back-balances driven up to mine bord on next lift. A tail-rope running with 22 boxes on each trip is used on this level, and has proved an economical feature in underground haulage, and from the success

obtained in its use I would wish to draw to it special attention, as with it in this district one boy can alone do the work that hitherto (8) eight horses and as many drivers were required to do, which success, I trust, will induce others to follow the example. From this level a tunnel has been turned off to strike the Scott pit seam; the tunnel it is computed, will require to be driven a distance of (600) six hundred feet, and to strike the seam down a distance of about 3000 feet from the surface. As the Scott pit seam improves in quality to the dip, it is believed that at this point the coal will be of extra good quality. On the lift below this the levels have been driven in on each side a distance of about (600) six hundred feet, and they intend driving them until the line is reached on each side, before extracting the coal, any further than to put up balances for returns, and then bring back the pillars on the fresh timber. There is sufficient coal on the 3000 feet lift to keep the mine working until the levels in the lower lift are in to the line. The Scott pit is now idle, and will remain so until the next season's shipping begins. The management intend to commence sinking another lift of (600) six hundred feet. The new winding engine, of which I made mention in last year's report, hoists (11) eleven boxes each trip.

Considerable expenses have been incurred this year in building the most important of which was a new brick engine house for the hoisting engine, also a new car shop; and the bank house being too small, was enlarged.

#### ACADIA MINE, WESTVILLE.

In last year's report I made mention of the difficulties they had to contend with in this mine, viz., fire damp and bad roof. I regret to say that in this respect during this year the difficulty has not lessened, but increased. This mine has a perpendicular depth of about 1500, feet, and as the coal is tender and contains a large percentage of gas, the enormous pressure causes the gas to evolve from roof, pavement and sides, and the mine being as well very dusty, it is therefore difficult to manage. In October, two workmen, viz., W. A. Sutherland and David McKay, were appointed by the workmen to examine the mine. I accompanied them, and according to their report they were not satisfied with the condition of the mine, and made some suggestions in which I could not agree, and did not consider practicable, and at my request you (E. Gilpin, Esq., Inspector of Mines,) in company with James Maxwell, manager, and myself, travelled this mine and carefully inspected the same, and were satisfied that everything that could be done was done for the safety of the workmen and the property. No explosives are used in the working of this mine, and the only lights used are the Marsant and Menseller lamps. The successful management of this mine certainly requires strict discipline, and it is to be hoped that the employees will cheerfully obey the orders of the management for the safety of themselves and property. I know that at one time during the year some of the workmen employed in this mine were very uneasy, and probably are so yet; if so, I can assure them that all is done for the preservation of life and property. During my (9) nine years' connection with this mine I have always

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found the discipline good, and trust it will continue. All the workmen are now in the 3560 feet lift, as the 3100 feet lift is finished; the pressure was so great on this lift that some little coal was lost in the finishing up, being the first coal lost in this mine in my time; the air returns were damaged some, but are pretty well opened up now. The new hoisting engine is giving good satisfaction, also the new pump. It is difficult to describe the difficulties met with in a mine of this description, and only the men who work in it, and the management who anxiously conduct it, can fully estimate or realize the trouble and cost of keeping airways open, and the mine in good order and safety.

VALE COLLIERY, THORBURN.

*Six Foot Seam.*—In my last report I spoke of the introduction of the long-wall system. This has been carried on during the year in the lower lift 2000 feet down, but is not meeting with the desired success; the roof is of a very strong nature, and the slips run into the coal face, giving considerable trouble, making it expensive to keep the working faces open. On the 1000 feet lift during the year, pillar work principally has been carried on with very good results. Some very heavy feeders of water have been struck in this mine, entailing considerable loss and expense, as the pumps were of insufficient capacity to keep the water out; they were obliged to flood the lower mine bord, causing them to carry the air for hundreds of feet with brattice, and the bottom being of a soft nature, caused falls in the mine bord, which had to be cleaved and timbered. The management were obliged to place two new Knowles pumps in the mine; these pumps throw about 560 gallons per minute. The mine was partly idle for 7 or 8 weeks until the pumps were started, reducing the output of coal considerably. The following buildings, viz., the locomotive shop, carpenter's shops, office, stables, store house and boiler house, were moved from the McBean slope and put up at this mine, and caused considerable expense in so doing. Culm is used in firing the boilers instead of coal. Now that everything is placed and the mine in good order, I would not be surprised to hear of a larger output of coal next year.

*McBean Seam, Thorburn.*—No attempt has been made to open up this mine during the past year.

MCGREGOR PIT, STELLARTON.

At my official visitation of this mine, on 24th April, I found the pillar work spoken of in last year's report stopped, and masons busily employed building them off, the temperature kept continually rising, and as it was beginning to get alarmingly high, the management, after careful survey, decided it was all but on fire, and therefore determined to close up this portion of the mine with brick, stone, sand, &c. Through the past summer the North and South slants have been connected at the bottom, and as in consequence the north engine can hoist all the coal, the south engine is idle, and in future can be used for sinking purposes. Two new back-balances have been started off during the year, but as there is now a very large area of this mine resting on pillars, it is not desirable to make very rapid

progress until the overlying seams are dealt with, but as these seams are now being developed, it is only a matter of time until the pillars can be safely drawn. The depth of the mine is now about 2670' down, angle of descent from 16° to 25°.

#### FOORD PIT.

It has been found necessary in the development of this mine to build some very extensive brick arches, the roof having been broken to such a height it was supposed the air was getting into the old workings. The stone arches around the bottom of the shaft were very much wrecked by the fire, and there is now some 500 feet of brick arch about the bottom, all well filled and packed at the back with sand, thus making them air-tight, and giving a soft rest to the pressure. The bottom now looks very well. Quite a number of other large brick stoppings have been built. Two slants have been sunk to the dip, a distance of about 400 feet, and still sinking. Soon they will be mining the coal from the deep.

The coal cutting machine did not prove as satisfactory as anticipated, the lower part of the seam having some very hard boulders, it was not quite able to cope with them; some changes are now being made in the machine to meet this difficulty. The pit-head gear has been renewed and the latest improved screens and tipples fitted up, and everything around the pit-head is new. Fifty new coke ovens have been built, and a tunnel driven to conduct the gas from the ovens to the boilers, to utilize the gas for raising steam in lieu of coal, which must undoubtedly result in great economy of labor and coal.

On one side of the mine the temperature is about 80°, and necessitates a considerable quantity of air to keep it cool enough for the men to work, and as they proceed to the dip the gas makes freely, and unless greater power be used, there is no means of increasing the volume of air, and as it is necessary to obtain increased airway, the English slopes that were sunk 1700 or 1800 feet have been started sinking again, and a place turned off the north level of the Foord pit to cross-cut the measures and meet the slants, thus as there are two slants when completed, will make a good travelling-way and air-way, and give a good field of coal, giving the Foord pit two more seams, viz., the Cage pit and four feet seam immediately overlying it, all down-hill for the coal excepting through the tunnel, which will be about 300 or 400 feet, and as the water now finds its way to the Foord pit, they will not experience much difficulty from that source. There has been some five or six places driven into the old works, which would seem to indicate some errors in the old plans; these places had to be built off with iron rails and brick and sand; they have had many difficulties to contend with, but so far every difficulty has been met, and this mine is again assuming its usual appearance.

*Third Seam Slopes.*—It is understood that the Cage pit and Third Seam are connected by a tunnel some 250 feet in length, and the extension of this tunnel has cut another 4' feet seam of the best coal probably in this county, and a band of iron stone which carries 45 per cent. of iron. It takes time to advance levels and get new works like



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this opened out, but I am pleased to say that this has been systematically and quickly done. During the year there was a back-balance driven up on the north side of Third seam, and nine bords turned away, and the levels extended a considerable distance beyond.

On the south side there has been a balance with 8 bords worked out nearly, and the levels extended. In the Cage pit seam the levels on north and south side have been rapidly extended and balances driven up.

In the Four Feet Seam the levels are also being extended and places driven up hill. Some of the iron has been taken out and roasted at the mine with satisfactory results. This seam of coal will be worked long wall.

#### SPRING HILL MINES.

It is unnecessary for me to say anything at length in reference to the explosion which occurred here on the 21st of last February, the investigation having been published in last year's report. I may, however, say there was a large staff of officials employed at this mine, all men of considerable practical experience, some of them extending over a period of thirty years. I was familiar with all of them, and had many private and public interviews with them, but never heard one of them to express fear of any kind in reference to the occurrence of an explosion; they one and all, like myself, appeared fully satisfied that everything was safe. I myself have had 30 odd years' experience in mining, and considered this mine one of the safest in my district; and further I may say, that six men, all good practical miners, most of them holding certificates as underground managers and overmen, were appointed by the workmen to examine the mine, and done so only a day or two previous to the explosion. I was present and read the report the evening before the explosion; they reported everything as satisfactory. The day previous to the explosion I travelled the section of the mine in which the explosion occurred, accompanied by H. Swift, "manager," a man of large practical experience in mining both in this and the old country. We were then both satisfied everything was in good order. The above goes to prove that in our profession of miners we have something yet to learn. As the years roll on our mines are gradually becoming deeper, and the vertical pressure greater, and in my experience as the depth of the mine increases fire-damp likewise increases. It would therefore seem that vertical pressure and atmospheric pressure are both active agencies in liberating gas from the strata, if there be any pent up seeking admission into the work.

It was only two weeks after the explosion when the mine was again being partially worked, the damage underground being slight when we think of the terrible loss of life. These collieries are now comparatively clear of gas. At the working faces there are times when a few inches is found by the fire-boss, more especially in up-hill places where the brattrice is not kept close up; but as to gas being in standing places or old work, I never found it, nor do I know of any man who ever did. The overlying strata in Cumberland County does not carry fire-damp like the Pictou County coal seams. The Pictou

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County coal basin has for its cover bituminous shale, while Cumberland County coal basin has more freestone and fire-clay, which accounts for being less gas than in Pictou collieries. Safety lamps is the only kind of light now used in this mine. Explosives are not used.

There has been quite a lot of work done in the air-ways, and the volume of air considerably increased. The new lift which was sunk last year in the East slope has been opened up this year, and levels driven east and west. During the year the West slope has been sunk down 1200 feet. There is also a new lift in the North slope, and one in the East slope 600 feet each, and 1200 feet in the West. Properly speaking, we do not know the extent this lift may be driven westwardly, as every year further developments are made of this seam westerly, until now they are proven for some miles with slight variations southerly, caused by up-throw dikes or faults. Easterly the No. 5 slope is proved to some extent a distance of one mile roughly speaking.

There are somewhere about 1400 men and boys employed in these mines, and when we take into consideration the hazardous nature of their employment the casualties that do occur are comparatively few. During the year there has been placed in the North slope a new duplex pump.—high and low pressure, water barrel 10 inches, stroke 36 inches, water-column  $10\frac{1}{2}$  inches; the pipes are lined inside with wood.

#### JOGGINS MINES.

All the work done in this mine during the year was long wall. It has proved very successful here, as the coal taken out under this system is larger, and a larger per centage of coal is won. I would say that 95 per cent. of all the coal is taken out, it may require more timber, but the larger per centage of coal obtained amply pays the difference. The men also can dig a larger quantity per shift than under the old system.

The water level has been cleaned and timbered from the shore to the slope, a distance of one mile and an eighth.

Formerly the road for delivering the coal at shipping, which was one mile and an eighth in length, was laid with double tracks and operated by an endless rope, the engine operating it being located at the mine. The coal was then dumped into a chute of about 150 feet in length, and run into the vessels lying at the wharf, of which only one could be loaded at a time. During the past year the whole business has been remodelled. At the wharf, instead of the chute, in the same place there has been two tracks laid, and the wharf extended, and several places made in which vessels can lie and be loaded at the same time with different kinds of coal. At the head of these two tracks is placed a drum barrel with brake attached, and the full boxes running down bring up the empty ones. Instead of two tracks from the pit and an endless rope, there is now only one track with sufficient descent in it for the full boxes to run down with rope attached, and the engine then pulls back the empty ones, thus doing away with half of the track and rope formerly used.

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The mine is now in order to yield a large output of coal. There has been no gas reported in this mine during the year, and during the same time has been free from any kind of accidents.

No explosives are used in working the coal; the powder and dynamite used was in stone, and in cutting through a large fault in three places, and some brushing for horse roads.

#### MINUDIE.

This mine was worked for two or three months last winter, and then remained idle until the middle of November, when it was started again with 10 or 12 men, the object being local sales for the winter.

#### LAWSON MINE.

This mine was idle for two or three months during the summer on account of their engine house being destroyed by fire. It has been rebuilt, and the mine at work again with from 8 to 10 men employed in it.

#### CHIGNECTO MINES.

This mine was worked during the winter along the crop, a few men being employed getting out coal for local sales. In the spring Frank Burrows, the underground manager, started prospecting the property. He was supplied with a Diamond drill, capable of drilling 1000 feet, and had 10 to 12 men employed, and has up to my last visit, December 1st, continued at work, and has drilled a series of holes from near Athol station to the Stoney half-mile. I learned he had drilled through some of the coal measures. He has now drilled three holes of about 600 feet depth each, and has began to drill the fourth.

#### SCOTIA.

Alexander Dewar, reported as having 3 or 4 men employed at this mine, ceased operations at the end of the year, and has not resumed since.

#### BLACK DIAMOND MINE.

Principally pillar work done here during the year. They are getting along very successfully and mining a good per centage of coal. It is now under the management and control of the Acadia Coal Company, Limited.

#### EAST RIVER AREA.

*John Muir and Sons.*—Work has been carried on here just as usual.

On July 17th I visited Sydney Mines, C. B., in company with Mr. Patrick Neville, Deputy Inspector of Mines. After examining the mine report book, we selected No. 1 South new angle dip, where gas had been reported previous to my visit. We found everything in good order and no gas. We tested with Leving's Gas Indicator, and the most we could find was  $\frac{1}{2}$  p. c. in the "return" from South new

angle dip. The air-ways, as far as I seen, were in good condition, and the mine was fairly damp, except the hauling roads which were dusty, and I think might be watered. There is in this mine a very large waste, or standing work, which I did not see, and cannot say anything about it. What I did see was in good order, except the dust on the hauling roads.

On November 28 and 30 I visited Leicester in Cumberland County, where coal was reported to have been discovered. I found Mr. Sharp at work with 6 men east of the Styles mine, on the bank of a brook. He had 5 seams of coal exposed; about sixty feet of measures were between the first three seams, which appeared in thickness to be as follows: 1st seam, 3 feet; 2nd seam, 5 feet, 4 inches; 3rd seam, 3 feet, 6 inches. Then 107 yards south were the other two seams, one 6 feet and the other 9 feet, dipping south  $10^{\circ}$  west at an angle of  $45^{\circ}$ .

There are good indications further east, lots of drift coal on the surface and a good level country. I cannot probably do justice to this section of the country, as the crop-out of the seams appeared disturbed. I never seen any coal burn better than it does in a stove.

I would further say that a very familiar form of accident in all our coal mines is caused by coal falling from the working face. This, in my opinion, can be remedied to a very great extent, by first, the management strictly enforcing the proper timbering of places, and secondly, making it the duty of their officials when visiting a working place, not merely to ask the men how they are getting on, but to look and ascertain if the place is properly timbered, and if not, to cause that it be done at once.

Another familiar form of accident is the "trapper boys" either jammed by boxes, or trampled on by horses. The cause is in many instances leaving their doors to gratify some curiosity, or in visiting the next trapper, but more frequently by going to shift points or some other duty for the driver. These are two of the most familiar form of accident met with, and they, I have no doubt, can be greatly decreased by the management preserving strict discipline and rigidly enforcing the laws. So far we have been very fortunate from accidents by raising or lowering men in slopes, as every practicable provision has been made for safety. This, however, is not so in our perpendicular shafts. No provision has been made in them to meet such accidents as over-drawing or breakage of rope, and the time has now come, in my opinion, when some protection should be made to meet such kind of accidents, and appliances such as King's Patent Detaching Hook, or some other of a like nature of equal or more value, should be in constant readiness to meet with such accidents.

Herewith accompanying are the usual statistical information.

I have the honor to remain,

Your most obedient servant,

WILLIAM MADDEN, JR.

## LIST OF ACCIDENTS FOR THE YEAR 1891.

Number.	Date.	Mine.	Name.	Occupation.	REMARKS.
1	Jan. 7.	Spring Hill, No. 3.	John Palmer.	Loader at chute.	Hand smashed between timber and boxes.
2	" 9.	" " 2.	Fred. Carmichael.	Miner.	Collar bone broken; fall of coal from working face.
3	" 31.	Forde Pit.....	Joseph Keefe.	Shiftman.	Leg broken; timber fell on him.
4	Feb. 17.	Spring Hill, No. 1.	Fred. Mumford.	Miner.	Collar bone broken; fall of coal from working face.
5	Mar. 14.	McGregor Pit....	William Frew.	Miner.	Leg broken; fall of coal from working face.
6	" 20.	" "....	Guthrie Munro.	Loader.	Foot badly smashed; a piece of coal fell on it.
7	June 5.	Spring Hill, No. 2.	John Lodge.	Loader.	Hurt by fall of coal in sinking slope.
8	July 15.	" " 1.	Adam Porter.	Miner.	Hurt by roof stone falling on him.
9	" 15.	" " 3.	John Shannahan.	Driver.	Hurt; slipped in front of box.
10	Aug. 28.	" " 2.	Neil McDonald.	Miner.	Leg broke; fall of coal from working face.
11	Sept. 12.	3rd Seam, Albion Mines.	Hector McKenzie.	Miner.	Strained his ankle; getting off riding rake.
12	Oct. 1.	Black Diamond.	Ed. Sutherland.	Miner.	Leg broken; fall of top coal.
13	" 15.	Spring Hill, No. 2.	Thos. Shields.	Laborer.	Leg broke; box accidentally leaving track on level.
14	Nov. 5.	" " 3.	Wm. McDonald.	Cage-runner.	Hurt; cage left the rails.
15	" 6.	" " 2.	D. McMillan.	Driver.	Arm badly smashed; caught between prop. and rake of boxes.

Amounts of air measured at visits to Mines in Pictou and Cumberland Counties, 1891.

NAME OF MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Acadia .....	62,000	60,100	64,000	61,740	60,500	60,000	62,200	58,000	59,100	60,250	58,900	54,500
Black Diamond .....	13,200	17,100	15,000	14,700	14,850	14,000	13,900	14,200	14,000	15,000	25,000	24,500
Drummond .....	82,200	84,000	82,500	81,900	80,000	78,800	76,750	68,800	70,200	74,900	81,700	80,700
Scott Pit .....	10,250	9,400	13,500	14,100	13,700	13,500	12,900	7,170	8,900	Idle.	.....	.....
Six Feet Seam, Vale .....	38,000	35,500	42,000	42,500	36,500	28,300	28,250	32,200	32,700	30,000	31,200	32,000
John Muir & Sons .....	1,000	1,150	2,000	2,000	1,700	1,200	1,000	1,150	1,400	1,350	1,464	1,250
McGregor Pit .....	96,550	94,250	99,500	97,700	98,500	90,500	100,000	84,700	89,700	97,950	102,000	100,000
Thorburn .....	31,000	30,000	32,500	37,500	34,800	.....	37,000	42,000	41,700	37,500	38,900	37,700
Foord Pit .....	33,000	32,200	.....	.....	.....	25,600	.....	.....	.....	22,500	20,000	.....
English Slopes .....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	4,250	4,000	4,100
Lawson .....	1,700	.....	Idle.	4,275	4,000	2,100	1,200	1,000	1,200	1,350	1,500	1,460
Minudie .....	1,000	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,260
Joggins .....	38,200	Idle.	35,700	36,900	32,200	30,100	30,000	28,500	30,200	30,500	33,500	32,900
Spring Hill Mines:—												
No. 1 .....	72,500	75,700	78,100	76,500	75,900	72,600	68,700	67,900	73,100	76,700	80,000	87,400
No. 2 .....	60,000	62,000	60,900	57,500	59,800	57,950	52,780	53,100	54,300	53,200	54,700	52,000
No. 3 .....	52,700	53,000	53,700	51,800	57,600	53,300	53,300	52,700	53,950	54,900	53,800	52,200

OFFICIAL VISITS, YEAR 1891.

MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Acadia, Westville.....	1	3	28	20	25	15	6	28	17	{ 13 } { 28 }	5	23
Black Diamond, Westville....	6	.....	21	21	16	2	1	24	10	17	4	17
Drummond Colliery, " ....	8	2	26	22	15	5	3	27	11	15	18	14
Scott Pit, Westville.....	8	2	26	Idle.	15	5	3	27	11	Idle.	.....	.....
Six Feet Seam, Vale, Thorburn	10	9	25	25	20	9	7	18	22	26	19	22
John Muir & Sons, E. Riv. Area	10	9	25	25	20	9	7	18	22	26	19	22
Haliburton Mine .....	9	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	.....
McGregor Pit, Stellarton.....	12	6	23	24	18	6	Idle.	26	15	20	17	16
Thrd Seam, " .....	12	6	Idle.	3	19	Idle.	9	25	12	19	16	15
Foord Pit, " .....	28	.....	18	3	22	27	.....	Idle.	13	Idle.	2	.....
English Slopes, " .....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	20	16	15
Chignecto Mines, Cumberl'd Co.	17	Idle.	.....	13	Idle.	.....	Idle.	.....	.....	.....	.....	.....
Lawson Mine, Maccan Station	19	13	11	13	22	Idle.	5	4	Idle.	Idle.	6	.....
Minudie Mine .....	20	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	1
Joggins Mines .....	20	Idle.	12	10	12	22	28	4	5	6	7	1
Spring Hill Mines, No. 1 Slope.	15	20	9	7	11	19	25	.....	2	7	9	2
" " No. 2 "	15	21	9	8	8	19	25	.....	2	7	9	2
" " No. 3 "	16	19	13	9	9	18	24	.....	1	8	10	3



Table shewing number and lineal feet of Props and Booms, and quantity of Explosives used at each Colliery during Year 1891.

MINE.	PROPS.			BOOMS.			EXPLOSIVES.		
	No. of Pieces.	Lengths.	Lineal Feet.	No. of Pieces.	Lengths.	Lineal Feet.	Powder. lbs.	Roburite. lbs.	Dynamite. lbs.
Chignecto .....	.....	.....	2,000	.....	.....	.....	150	.....	.....
Drummond Colliery .....	.....	.....	196,100	.....	.....	.....	260	81	.....
Acadia .....	.....	.....	317,284	.....	.....	.....	.....	.....	.....
Albion .....	.....	.....	99,401	.....	.....	.....	12,100	6,000	.....
Vale .....	.....	.....	227,343	.....	.....	.....	26,717	.....	.....
Joggins .....	27,000	8'	216,000	.....	.....	.....	200	.....	150
.....	25,000	4'	100,000	.....	.....	.....	.....	.....	.....
.....	3,000	6'	18,000	.....	.....	.....	.....	.....	.....
Lawson .....	12,000	2' 6"	30,000	.....	.....	.....	225	.....	.....
Minudie .....	1,500	6'	7,800	.....	.....	.....	360	.....	.....
John Muir & Sons .....	.....	.....	7,000	.....	.....	.....	550	.....	.....
Scott Pit, Drummond Mine ..	.....	.....	.....	.....	.....	.....	2,687	942	.....
.....	23,900	10	239,000	3,080	10	30,800	.....	.....	125
.....	51,370	12'	616,440	32,300	14	452,200	3,538	.....	.....
Spring Hill Mines .....	.....	.....	.....	{ Extra heavy.	12	44,775	.....	.....	.....
.....	.....	.....	.....	2,985	14	.....	.....	.....	.....
.....	.....	.....	.....	.....	18	.....	.....	.....	.....
.....	.....	.....	2,076,368	.....	.....	527,775	46,787	7,025	275



## CAPE BRETON COUNTY.

The total sales for this County were 982,392 tons against 916,994 tons in 1890.

The increase was principally in the home sales and those to the Province of Quebec.

During the past year the Gardener mine was got into good working order by the Burchell Bros., who introduced a Jeffrey's electrical coal cutting machine. The Sydney and Louisburg Coal and Railway Company re-opened the Emery seam. Both these mines are said to yield a coal adapted for steamer uses. Preparations are being made for introducing mechanical coal cutting machinery into several mines in the Cape Breton district. As a result of the construction of the Cape Breton Railway coal from this district is burned on the Eastern Extension Railway.

The production of the Collieries is for the year 1891, was as follows :

COLLIERY.	RAISED.	SOLD.
Bridgeport.....	30,897 tons.	32,547 tons.
Caledonia.....	159,985 "	144,995 "
Gardener.....	18,746 "	17,105 "
Glace Bay.....	117,767 "	110,212 "
Gowrie.....	158,064 "	152,367 "
International.....	133,179 "	124,677 "
Ontario.....	3,111 "	2,709 "
Reserve.....	170,844 "	154,656 "
Sydney.....	170,691 "	146,645 "
Victoria.....	111,037 "	96,479 "

Prospecting was carried on at several points in Cape Breton County, and it is claimed that a new and workable seam has been found underlying the Gardener seam. Such a seam would prove, owing to the great extent of country it would underly, a great addition to the coal resources of the Island.

At East Bay, Mr. Young, on behalf of some American capitalists, has been engaged in sinking on a bed of hard coal, and will continue with better sinking appliances in the spring.

The Mabou Gypsum Company have opened one of the Mabou seams and sold a few tons. The seam is  $7\frac{1}{2}$  feet thick and of good quality. A wharf has been built, and it is expected that next summer a considerable trade will be done with Nova Scotia and Prince Edward Island.

I append Mr. Neville's report on his inspections during the year 1891.

BRIDGEPORT, Dec. 31st, 1891.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines:*

*Dear Sir,*—I beg leave to forward you a report of my inspection through the Cape Breton coal mines, during the year ending December, 1891.

## SYDNEY MINES.

The north side pump deep has been driven further to the dip and a new landing opened there, two hundred and ninety-one yards below the old landing. No. 1 angle deep, south side of pit bottom, has been driven through the trouble and extended, so that a new landing has been opened at three hundred and thirty yards further to the dip than the old landing, also No. 2 angle deep south side, has been extended and a new landing opened out three hundred and thirty yards further to the dip than the old one.

A new and larger spur wheel has been put on the north side underground engine to increase its hauling capacity. A new Jack engine drum and ropes have been put in for lowering and drawing the men from the pit. Also the back of the cages are boarded in and an iron bar placed across the front for safety.

The ventilating fan has been much improved in efficiency, by tacking sheet rubber to the periphery or margin of the blades, also by enlarging the outlet for the escaping air. A second new apparatus has been erected to help the filling away of the bank coal during shipping season. Cast iron tubing has been provided with which to line the pumping shaft at points where the stone is wasting away, by reason of the heat from the steam of the underground engine.

The heapstead pit tops, boiler seats, and engine houses, have been lighted by electric lights. A small horizontal engine and dynamo have been put up for that purpose, all of which gives satisfaction.

## VICTORIA MINES.

Work has been brisk at this mine during the last season. Since my last report the east levels in the 1800 feet lift has been driven 380 yards, and another balance has been driven up. The west levels in the same lift have been driven about 150 yards; and a balance won out. The 1200 feet east levels have also been extended about 400 yards.

Stooping has been successfully carried on during the shipping season. A new angle deep is being driven off the main east slope, at a much lighter angle of dip, for the purpose of shortening the haulage in the level by horses; and also to enable the surface hauling engine to bring out a much larger trip of coal each time. The west levels in the 1200 feet lift in the west slope have been standing nearly all this season, and only one balance is being worked at present; but the main slope is being driven down to win out another lift of 600 feet. The new engine for the fan mentioned in my last report has been placed and working for some months.

A tubular boiler, 14½ feet long, and five feet diameter, with 75 tubes in it, has been placed near the fan, and is quite able to supply the two fan engines with steam.

A new fan shaft, 8 feet square and 40 feet deep, has been sunk and connecting with the main airway.

The erection of another Champion or Murphy fan 8 feet diameter, has commenced. They have also put in another common Egg end

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boiler, 36 feet by 5 feet 4 inches diameter, in place of two small ones. A gangway was erected in the spring between the coal bank and heapstead, and a donkey engine placed underneath it to draw the coal to the screens.

LINGAN.

A few men have been working in the pit there this season, getting out some coal which has been taken to Sydney Mines to make coke of.

GARDENER MINE.

Since last report this mine has been dried, equipped, and put in operation. Its condition was found to be better than was anticipated. Engine house, forge, office, and dwelling house are all being repaired, also a new store has been built. The heapstead has been finished, the shaft has been cribbed, buntings and guides put in. The two Cameron pumps that remained in the mine under water for about twelve years were in good condition, and with slight repairs are found to be all that is necessary for keeping the mine dry.

The air shaft has been cribbed and the water that formerly used to go down it has been dammed off. Ladders are placed in it for the workmens' convenience. In the latter part of the season the air was changed from its former course bringing it in a shorter direction to where the men work; this made a marked improvement in the ventilation.

The bottom of the main roads both north and south of the pit bottom have been blasted up, admitting the use of larger horses for hauling; also the management has disposed of the tubs formerly used in this mine, and instead are using on the south side of the pit a tub of double the capacity.

The extension of the south level and the next rooms above it shows a marked improvement in the thickness of the seam. The Jeffery coal cutting machine has worked steady since August; the results attained are satisfactory, a gradual gain is made as the men get more acquainted with the machine.

Mr. Burchell informs me that in the latter part of December a cutting of 270 square feet was made by the machine with two men in three and one half hours, which would be equal to 770 square feet in a shift of 10 hours. The electrical plant was manufactured by Messrs. A. Robb & Sons, Amherst, N. S., this plant, besides furnishing power for the machine, supplies the engine house and bankhead with electric light.

CALEDONIA.

During the last season the main or west deeps have been extended about 600 feet, and two sections on both sides won and opened there. The west high lift levels have been extended and rooms broken off. The levels on the east side from the bottom of the 700 feet deep slant have also been extended and a large section opened out.

The workings to the rise were carried on as usual. A line of stone stoppings has been built and put in place of where the wood and board stoppings were, from the furnace to the lower landing on the main

deep. A second furnace of the same size has been added to the former one; it is built on the east side, and the escaping air goes from both, through the same shaft and cupola. This furnace ventilates the east side of the pit, and the former the west side, both having separate inlets and returns, all of which have made a great improvement in the ventilation. On surface a new building of 100 x 28 feet has been erected, to be used as a forge and carpenter's work shop. A new stone boiler house has also been built.

#### OLD BRIDGEPORT.

A new incline plane 900 feet long has been driven and put in operation from the south side of the pit bottom towards the rise. The south levels have been extended, and are now about 1600 feet from the bottom of the shaft. The ventilation has been greatly improved in this mine during the past season.

Stoppings have been put up along the levels, headways and through the rooms where required, also a return airway has been driven from the south side of the high workings direct to the back part of the furnace, giving two returns.

#### RESERVE MINES.     !

This mine has been worked pretty busy during the last season. The French or east slope has been driven down 350 feet further, and levels turned off south and north, the south levels were driven 600 feet, and the north levels about 450 feet. A new landing has been made there and a fine section of rooms opened out, the coal is hauled from this section by means of a new steel wire rope leading from one of the engines on surface to the low landing, the trip is taken from this landing to the upper landing, when it is caught there by another rope and engine drawing it to the surface, this works remarkable well. Very little time is lost in unhooking from the empty and hooking on the full trip, and *vice versa*. The pillars have been nearly all drawn from the west side of the main slope. Work ceased there in October. A new cupola has been built on the east side instead of the old one that was blown down in October by a heavy gale.

#### EMF     MINES.

The dip slants have been driven about 650 feet and rooms broken off, and worked during the latter part of the season. The north levels on the high lift have been extended about 650 feet, and the south side levels 320 feet. As the dips are extended the coal seems to improve in quality and thickness of seam.

#### ONTARIO MINES.

Mr. Alexander McPherson commenced in the latter part of last March to secure and timber the slope and horse roads, and also to pump the water out of the dip. He succeeded while the weather remained dry, but as soon as the fall rain came he found that he was unable to keep the water down, so he finally abandoned the work. However, during the season he mined coal from a few rooms on the south side of the slope, below the high level.

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**GOWRIE MINES.**

This mine has worked in its usual systematic way during the most part of the year. From the bottom of the west deep slant a horse road has been driven northerly over the Fault, and a pair of levels turned off and driven westerly, a distance of 300 yards, and a section won out between the Fault and the anticlinal. Also, south and parallel to the Fault the levels have been extended westerly 200 yards.

A good travelling road for the workmen has been made from this district to the high level near the pit bottom. On the east side main deep where the roof was considered dangerous 150 yards of it has been taken down an average thickness of 3 feet, and the place well secured with timber one foot or more in diameter.

The levels going east have been driven 300 yards, and those going west extended about 400 yards, those levels have struck the Fault that is leading from the west dip slant.

**LITTLE GLACE BAY.**

During the past year the north levels have been driven about 900 feet, the south levels have been stopped, leaving a large barrier between them and the seashore at the harbour. The management has commenced driving a new deep on the south side of the pit bottom, with the intention of gaining a lift of 600 feet.

A new shaft 40 feet deep and  $8\frac{1}{2}$  feet square has been sunk as an airshaft, and an 8 foot fan placed in position, this is called the Murphy ventilating fan, and is reversible, the same as the one at the International, it works admirably well, and will be used as a blow down this winter if required.

A new double acting 12 inch fire pump, with 9 inch columns, is being put in for the purpose of relieving the pumps now in use. A new block of four tenants are added to the workmen's houses. A new block of crib work, 160 feet long, has been built and placed on the southern side of the harbour for its protection.

**INTERNATIONAL MINES.**

The south side slant deep road has been extended down 600 feet deep and another landing opened out there. This is the second landing on that road below the main level.

The main overcast north side of pit bottom has been reconstructed in the shape of an arch with old railroad rails bent for that purpose, they make a good strong arch and suits well where the roof is bad. They are lasting and can be moved to any other part of the pit for the same purpose if required.

An airshaft has been sunk 90 feet deep, 10 feet diameter, and an 8 feet fan, known as the Murphy ventilator, erected there. It is so constructed that it can be made to either exhaust or blow down, and is at present working as a blow down, but the intention of the management is to have it exhaust in summer seasons, it is capable of giving 80,000 cubic feet of air per minute if required. There has also been two new locomotives purchased and running during the past season in place of two of the old ones.

## MCADAM'S LAKE, EAST BAY.

Prospecting has been going on at this place during part of the season by American capitalists. I visited the place on the 11th of December, and found that Mr. Young, the man in charge, had left and gone to the United States. A shaft 65 feet deep by 8 feet long, and 4 feet 6 in width, has been sunk on a seam of very black shale; there are several seams of this shale showing on both sides of a brook that runs down towards the lake crossing the strata.

## CARIBOO COVE.

I visited this mine on the 18th of December and found 22 men employed there. A shaft has been sunk 130 feet deep, 14 feet by 6 feet divided in three compartments. The seam of coal that it is sunk on is called the 7 feet seam, but has not been proved as yet to be over 3 feet 9 inches thick. The coal is hard and burns well.

An new engine house has been built and a double cylinder friction hoisting engine, 35 horse power, put in position; also a pumping engine 7 inch cylinder 15 inch stroke, and a portable boiler 10 by 5 feet diameter. This engine besides pumping the water from the shaft, drives a fan which ventilates the pit.

A level has been driven from the seashore in on the 11 foot seam, a distance of 125 feet, and well timbered. A new dwelling house has been built, an office, barn, and forge. The company operating this mine reside in Rhode Island, U. S. President of the company, W. B. Gincks; Secretary, T. A. Buel; Underground Manager, James W. Wilson. The management says it is the intention to ship coal early next spring.

I would wish to make one remark respecting the accidents at Sydney Mines, where John Cann and Stephen Gillis came to their death, and was supposed to be killed in the shaft, and a verdict returned accordingly. A few days after the inquest poor Cann's cap was found on one of the buntings about half way up the shaft. This shows clearly that he must have fainted or fell by heart disease at that point, and afterwards rolled out by the motion of the cage near the pit bottom. A few hours after the inquest on the body of poor Stephen Gillis, I learned from several of the men around the works that he was subject to epileptic fits, and a few days previous to his death fell in the cage while coming to the surface, and was taken care of by a workman who was in the cage with him at the time, and was removed to the bank senseless. In conclusion, I may say that a great improvement in the ventilation has taken place in all the coal mines here during the past season, not only in the quantity of air but in the manner in which it is kept to the faces of the workings where the miners work.

I have the honor to be, your most obedient servant,

P. NEVILLE.



REPORT OF ACCIDENTS IN CAPE BRETON COLLIERIES DURING THE YEAR 1891.

DATE.	MINE.	NAME OF PERSON.	OCCUPATION.	AGE.	REMARKS.
Feb. 19 .	Sydney . . . . .	John Robson . . . . .	Miner . . . . .	19	Leg broke in cage descending pit.
" .	" . . . . .	James Evans . . . . .	" . . . . .	37	Ankles injured in cage descending pit.
" .	" . . . . .	John W. Jobs . . . . .	" . . . . .	22	Slightly " " "
" .	" . . . . .	James Handrican . . . . .	" . . . . .	25	Very slightly injured in cage descending pit.
" .	" . . . . .	John McNeil . . . . .	" . . . . .	42	" " " "
Feb. 24 .	" . . . . .	John Cann . . . . .	" . . . . .	40	Killed by cage when descending pit.
April 24..	Little Bay . . . . .	James McNeil . . . . .	" . . . . .	24	Hips injured by fall of coal in room.
" 25..	Sydney . . . . .	John Josso . . . . .	" . . . . .	36	Killed " " "
" " .	" . . . . .	William Merritt . . . . .	" . . . . .	34	Shoulder dislocated by fall of coal in room.
May 13 .	Gowrie . . . . .	John Rankin . . . . .	Shift-man . . . . .	27	Leg broke, trip forced road switch on it.
" 16 .	Reserve . . . . .	Alex. Johnstone . . . . .	Loader . . . . .	20	Back injured, fall of stone from roof.
" 18 .	" . . . . .	Neil McMullin . . . . .	Miner . . . . .	30	" " " "
June 13.	Caledonia . . . . .	Alex. McKenzie . . . . .	Driver . . . . .	15	Burned slightly on face and hands by gas.
July 11 .	Reserve . . . . .	Michael McMullin . . . . .	Miner . . . . .	36	Face injured by steammer shot, exploded loading.
Aug. 5 . .	Sydney . . . . .	Stephen Gillis . . . . .	Shift-man . . . . .	17	Killed, fell out of cage coming from work.
" 25 . .	Victoria . . . . .	John Didne . . . . .	Miner . . . . .	51	Leg broke, fall of stone from wall in pit.
Sept. 3 . .	Caledonia . . . . .	Rod. McDonald . . . . .	" . . . . .	21	Fell out of cage coming from work in pit.
Oct. 6 . .	Gardner . . . . .	Michael Gardner . . . . .	" . . . . .	22	Back slightly injured, fall of coal from roof.
" 26 . .	Victoria . . . . .	John Cashin . . . . .	Loader . . . . .	32	Leg broke by cuddy on balance while crossing.
Dec. 7 . .	Sydney . . . . .	Thos. Snow . . . . .	Shift-man . . . . .	23	Burned slightly on face and hands by gas.





*The following shows the average thickness of the coal seams now worked in the dip workings in Cape Breton Mines, and the kind of Lights and Lamps used by workmen while at work.*

NAME OF MINES.	Thickness of Seam.		Lights.	Lamps.	
Sydney Mines.....	5 feet.	6 inches.	Open Lights.	Common Fire Lamps.	
Victoria Mines .....	6 "	8 "	"	"	
Gardner Mines .....	4 "	4 "	"	"	
Old Bridgeport Mines.. ..	5 "	9 "	"	"	
Reserve Mines.....	8 "	9 "	"	"	
Emery Mines .....	4 "	9 "	"	"	
International Mines.....	5 "	10 "	"	"	
Little Glace Bay Mines.....	5 "	10 "	"	"	
Caledonia Mines.....	8 "	6 "	"	"	
Ontario Mines....	8 "	4 "	"	"	
Gowrie Mines.....	5 "	8 "	"	"	

Table showing cubic feet of air circulating through Cape Breton pits in 1891.

NAME OF MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Victoria Mines.....	41,200	44,800	44,880	42,000	41,440	42,000	47,620	44,800	41,900	46,720	40,320	44,260
Caledonia Mines .....	42,100	40,000	30,000	47,010	57,825	55,935	54,200	44,000	49,980	48,864	46,654	50,400
Old Bridgeport .....	19,000	18,000	16,000	30,000	25,680	29,930	23,220	14,740	18,640	29,015	39,390	30,000
Reserve Mines.....	35,000	46,860	47,340	54,880	43,500	42,900	59,680	47,330	43,592	52,483	50,000	49,920
Sydney Mines .....	60,000	60,207	62,420	63,770	61,240	52,380	50,000	55,000	58,900	63,890	75,080	49,000
Little Glace Bay Mines ..	16,400	20,000	10,500	15,560	11,249	19,200	15,000	20,000	10,500	12,000	12,560	19,500
Gowrie Mines .....	32,200	30,100	27,000	32,000	33,410	34,910	34,000	34,150	34,850	34,938	35,328	34,000
Gardner Mines.....	10,000	10,000	15,000	18,000	24,000	23,000	20,000	22,120	18,900	10,030	11,998	12,000
International Mines.....	.....	.....	17,500	18,000	29,500	34,500	28,750	25,000	29,000	34,000	35,000	36,500
Emery Mines .....	15,000	15,000	18,000	27,600	18,000	16,090	18,223	18,320	18,780	18,575	18,422	18,052
Ontario Mines.....	.....	.....	2,000	6,000	5,000	5,000	5,626	6,000	5,600	5,000	5,050	.....

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## GOLD.

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The returns for the year 1891 show that 35,212 tons of quartz were crushed, yielding 23,391 ounces of gold for 149,381 days' labor, as compared with 24,358 ounces from 41,886 tons of quartz for 160,264 days labor. It is to be regretted that there is again a slight decrease in the yield.

### SURVEYS—GOLD.

Mr. Samuel Smith was employed for the surveys required in Queen's County. Mr. McCallum was employed at Rawdon.

Mr. F. W. Christie was engaged in Brookfield, Colchester Co., in making the surveys required there in pursuance of the decision of the Hon. Commissioner in the matter of the applications of O. B. Browne and others.

Mr. James Anderson was employed in making surveys for the department in Montagu, Rutherford's Mills, &c.

Surveys were also made in the Wagamatcook district by Mr. Jos. McLean of Baddeck.

Mr. C. W. Pye made a number of surveys in the Sherbrooke and Stormont districts. It was found that the starting point used for many of the surveys in the Country Harbor district was incorrectly located on the office plan. Steps have been taken with a view of effecting a readjustment of the lines of the leases, &c.

The following General Statement shows the yield of each district :

## GENERAL STATEMENT SHOWING THE YIELD OF EACH DISTRICT.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per Ton.		Total Yield of Gold.	
					Oz.	Dwt. Grs.	Oz.	Dwt. Grs.
Tangier .....	2	3316	1	42	0	6 6	13	3 12
Whiteburn .....	1	5751	2	803	1	0 6	813	12 2
Central Rawdon .....	1	4404	1	510	0	1 8	342	0 0
Killag .....	1	5375	1	379	0	18 11	354	6 16
Oldham .....	2	15085	2	2019	1	9 0	2909	10 13
Cariboo	3	14426	4	5489	0	5 1	1486	14 21
Moose River }	1	5595	1	1823	0	7 15	698	9 0
Wine Harbour .....	3	11065	3	1611	0	7 11	602	4 0
Waverley .....	1	7228	1	2432	0	6 13	800	3 0
Lake Catcha .....	2	18522	2	4562	0	12 16	2396	10 12
Fifteen Mile Stream .....	3	10154	4	1751	1	13 20	2965	5 4
Uniacke .....	2	5728	3	863	1	11 10	1361	1 0
Montague .....	2	9651	4	829	1	3 2	957	3 4
Stormont .....	2	17520	2	4826	0	19 12	4664	13 17
Malaga .....	1	10580	1	5210	0	5 9	1406	0 0
Salmon River .....	4	2537	2	464	0	5 3	119	5 0
Sherbrooke .....	3	2444	5	1399	0	5 3	361	0 4
Unproclaimed, etc. ....								
Total .....	34	149381	.....	35212	.....	.....	22251	2 9

The following returns were received after the tables were made up :

			Tons.	Oz.	Dwts.	Grs.
Dec.....	Phila G. Mg. Co's Mill...	Brookfield, Q....	150	60	18	0
Oct. Nov. and Dec..	Rossignol Mill .....	Whiteburn Q....	87	81	15	2
Dec.....	Rockland " .....	Stormont, Guys..	59½	68	9	0
Jany. to Dec. ....	Essex Co's Mill.....	Tangier.....	328	58	9	0
Dec. ....	Moose Riv. G. Mg. Co.'s Ml.	Caribou .....	131½	22	11	0
Oct. Nov. and Dec..	Herbert Dixon's Mill.....	" .....	180	214	0	0
Dec. ....	Withrow .....	S. Uniacke.....	95	80	0	0
Dec. ....	Fifteen Mile Stream .....	.....	300	154	0	0

There have been several accidents in the gold mines during the past year from premature explosions of dynamite. In each case there appeared to be a want of exact attention to the rules governing the safe use of this explosive. The explosion at Oldham appeared to have arisen from the miner, who lost his life, driving in the priming cartridge, detonator and fuse with a heavy iron tamping bar. Another accident at Salmon River on the Eastern Shore, was reported as due to the use of frozen dynamite, in defiance of the rules governing the use of explosives at the mine where the accident happened. Managers of mines where dynamite is used should be unceasing in their exertions to caution and educate their miners to the safe use of the high explosives, and they should be entrusted only to miners who are found, after due enquiry, to have had a reasonable amount of experience in handling them.

The various districts were visited by Mr. Maddin, Deputy Inspector, who reports the mines generally in fair order and safe. With respect to some mines arrangements have been made for introducing better and safer ladders. The ephemeral system of gold mining which prevails in this province, makes it very difficult for the Department to exercise anything like a close and regular supervision over the smaller mines. A small mine is rapidly opened out and abandoned within a few months. The work being tentative, little attention is paid to points which receive the attention of a manager in larger and more ambitious workings. The enforcement in all gold mines of a strict adherence to the letter of the Mines Regulation Act would require the services of a man specially devoted to the work. There should also be some system adopted of keeping a check on the work performed in the mills. At present the returns are received as made; and it is believed that there are annually considerable unaccounted for amounts of gold extracted from rich quartz by hand, on which no royalty is paid. I append Mr. Maddin's notes of his visits.

E. GILPIN, JR., Esq.,

*Inspector of Mines.*

On August 4th, I visited Wine Harbor, at which place R. McNaughton was working, with Adam McGrath as under-manager. The middle lead was stripped, and operations began on the Caledonia lead; 20 men were employed underground, and 10 men over-ground. George Sutherland was fatally hurt by the dynamite exploding while charging a shot, and Edward Webber hurt.

*August 5th.*—At Goldenville, George Hirschfield was working in the McLean lead, employing 4 men taking out the roof quartz, allowing the waste to fall down the mine, and making an opening for water. The Sutherland and Chicago mines were idle, but the Blackie mine was at work, employing 6 men, and things appeared very dull in this mining camp. At Ecum Secum the mine was idle. There are very many complaints against so many trial pits being left open unguarded, farmers having in many instances lost some of their stock.

*August 6th.*—At Dufferin Mine, Salmon River, South and North leads working, and down from 250 to 300 feet; 30 men are employed. A new **20 stamp mill** ~~has been~~ erected, a self-feeding Blake's Rock Breaker is also used at this mill, ~~and all the~~ machinery is run by water power.

*August 7th.*—Visited Tangier Mine, and found mining matters very dull. One of the old veteran miners, John Murphy, had 4 or 5 men employed on the Strawberry Hill lead, which was all the work that was being done in this vicinity.

*August 8th.*—At Oxford Gold Mining Company, East Chezzetcook. J. M. Reade, manager, with 31 men employed. This mine is very well equipped with good machinery. Compressed air is utilized in doing a very large amount of the works; here, on August 1st, the first accident they have had occurred. One Mike Grady on that day unfortunately had his skull fractured, a piece of plank having fallen from the bucket to which he had secured it in the shaft, and striking him on the head. John H. Anderson had 6 men employed erecting a new mill, and N. McMillan had 4 men employed opening up "Colman lead," or "Annand Mine."

*August 10th.*—At Montague Mines, Alex. P. McQuarrie, manager, and W. Collins under-manager, 28 men employed. They were at work taking down the old mill and preparing to rebuild and put in a new battery, and from the appearance of the mine and the push of the management, with such a body of good practical men as are here, I should think we shall have good accounts of this mine in the near future. In this district there is also the Hay mine, Wm. Skerry, manager, with 14 men employed. Here they have had a difficult task to keep the water out, but I am glad to say that at the date of my visit Mr. Skerry had almost overcome this difficulty, and was getting his mine timbered and fixed up. T. M. Baker is also at work on the iron lead, so called, employing 3 men; and Mr. Pratt is working the Sutherland mine, on what is supposed to be the iron lead, employing 3 men.

*August 11th.*—At Lake View Mining Co., Waverley, A. A. Hayward, manager, and Matt. Thompson, under-manager. This mine was idle at the time of my visit, but it is one of the best equipped that I saw. There are 7 drills run by compressed air, one of Gates' Rock Breakers, self-feed; 30 Stamp Mill; Boilers, 280 H. P.; Mill engine, 230 H. P.; Hoisting engine, 130 H. P.; Pump engine, 25 H. P.; a Compressed engine, 50 H. P.; Shaft, 300 feet depth; Self-dumping skips. This mine did employ 50 men. The water was out when I was there, affording an opportunity of travelling all through it.

In this District there is also the West Waverley Mine, John Hardinan, manager. Some 30 men employed. The mine was idle, but the men were employed erecting new mill and new hoist. Windsor Junction Mine, Capt. George McDuff, manager. Some sinking has been done here.

*August 12th.*—Visited Renfrew Mine, R. S. Turnbull, manager, A. Manning, under-manager. Mine down 400 feet, and in good order and condition.

*August 13th.*—At Gay's River Mine, R. R. McLeod, manager, with 40 men employed. A 50 Stamp mill has been erected; this mill was built by the Truro Foundry Co. The gold is obtained here chiefly from the surface. It is not a quartz gold bearing mine, but is more of a placer mining that is carried on here.

*August 14th.*—Visited Moose River, Mr. Touquoy, manager. 17 men employed. A 15 Stamp mill and 3 pumps run by water power, with plenty water to run as many more. In this district A. McGregor and Wm. Bruce are working on the Moose River property, with 10 men employed.

*August 15th.*—At Caribou District, L. L. Wordsworth, manager. This mine is down some 400 feet, and at the date of my visit was very poorly timbered. I did not see the manager, but left word with one of the employees for him. In this district, Mr. Dickson is doing a very good paying work, and his mine was in good shape.

The mines which I have visited to this date were all well ventilated and timbered, with one or two exceptions. I may, however, say that instead of hanging ladders on the foot wall in those mines where the angle is so high, it would be much better to hang them lengthways on the lead, they would then have more slope. At present in many of the mines the ladders are nearly perpendicular. in distance ranging from 50 to 200 feet, and no means provided to save a man if he were accidentally to stumble and fall. I am pleased to say that very few accidents have occurred, but as the shafts are gradually becoming deeper, the time has arrived when such a preventative to accidents as I have suggested should be adopted.

*December 7th.*—I visited the following gold mines in Queen's County: Whiteburn District, Rossignol Mine. This mine has been idle for some time, and is just getting fairly started. F. B. Murchay, Esq., manager, says he expects to do well this winter. There are 20 men employed, and have a 10 stamp mill running, and everything looks well about the mine.

Whiteburn Mine,—Partinger, manager, Michael Kelly, under-manager, with 40 men employed. The shaft is 200 feet deep, and well timbered. 10 stamp mill. The perpendicular lead or mine is idle, the manager is prospecting close by the old shaft. Everything looks satisfactory around this mine.

*December 8th.*—Visited Malaga Gold Mining District, G. A. Wade, manager, John Thornholm, under-manager. 27 men employed, 2 shafts working. Main shaft 200 feet deep. The travelling way is the best I have seen; the ladders are at an easy angle, and stages every 20

feet. I was informed there were 3 or 4 men hurt by an explosion of dynamite last March at this mine. The magazine is attached to the blacksmith's shop, and a young man was asked to take a shot down the mine. He went into the building with his burning candle, setting fire to the fuse of the prepared shot. It was contrary to orders for any one to go into this place except the bankmen, and no light other than a lantern was allowed. The blacksmith lost his foot; his name is Alex. McInnis; James Boldin, night boss, was hurt, and Thomas Moore, who was visiting the mine, lost his eye. This is the only accident in this county I could hear of. North of this F. H. Ballou is working, employing some 30 men; his travelling way is very good. I may say all the travelling ways in this county are good. A little east of this, Charles McLeod is working in the Nine Bolder lead, so called, employing 8 men. The Caledonia Mine is idle, their mill house was accidentally burned some time ago. The Parker Douglas is also idle, which makes business somewhat dull in this locality.

*December 9th.*—I visited Brookfield Mine, G. A. Kenty, manager of the Philadelphia Gold Mining Company; they employ 30 men; 3 shafts working; the main shaft is down 200 feet. All the mines in this county are in good condition, but have not so many men employed in this district as were last year.

I may say it has hitherto been the prevailing system in the Gold Mining industry in this Province, when the work arrives at a distance of from 200 to 400 feet, to cease operations, the operator in many cases being unable to go deeper on account of the inadequacy of the machinery to go to any greater depth, and because of the fear that at any "greater depth," gold ceased to be found. I have learned that at Goldenville, however, a shaft has been sunk to a depth of some 600 feet, and paid to the last inch. In my opinion there is very great room for the supposition that some of the most valuable properties in this Province are being virtually lost, unless some means be adopted to encourage the operators to prospect some property at a depth of from 1,000 feet to 2,000 feet.

I am, Sir,

Your most obedient servant,

WILLIAM MADDEN, JR.,

*Deputy Inspector.*



## MISCELLANEOUS.

### SCHOOLS OF INSTRUCTION FOR MINERS.

During the year 1890 Instructors were appointed at several Collieries for the purpose of preparing candidates desirous of presenting themselves as candidates for certificates of competency as underground managers and overmen.

The following list shows the localities where schools were opened, and the names of the instructors:—

Westville.....	J. W. SUTHERLAND.
Thorburn .....	PETER McMILLAN.
Springhill.....	W. B. WILSON and A. D. FERGUSON.
Reserve Colliery .....	ISAAC GREENWELL.
Glace Bay .....	DAN. HARDY.
Joggins .....	T. BLACKWOOD,
Low Point.....	JOHN WEIR.

By error in the Mines Report for 1890, page 28, Thompson Fletcher was referred to as having received a certificate of service as manager instead of underground manager.

At an examination held May 27, Joseph Quigley, Westville, and Frank W. Crawford of Westville, received certificates of competency as underground managers, and Alex. D. Ferguson of Springhill, received a certificate of competency as overman.

At an examination held October 13th, the following received certificates:—

#### OVERMAN.

ROD. D. CAMPBELL.....	Little Glace Bay.
DOUGALD MCADAM.....	"
DAN. J. MERLIN .....	"
JOHN FLETCHER .....	Springhill.
NORMAN MCLEOD .....	"
JOHN J. McKENZIE .....	"
JOHN McKENZIE .....	Joggins.
R. WEEDIE .....	"
GEORGE WALKER.....	"
BENJAMIN SMITH.....	"
ALEXANDER MCAULAY .....	"

## UNDERGROUND MANAGER.

NEIL F. MCNEIL .....	Glacé Bay.
NEIL J. GILLIES .....	"
JOHN MCINTOSH .....	"
JOHN FIELDING .....	Reserve Mines.
THOMPSON FLETCHER.....	"
EDWARD ROGERS.....	"
DAV. WILSON .....	Lorway Mines.
JOHN JOHNSTON .....	Westville.
DAVID A. PATON .....	"
WALTER A. SUTHERLAND .....	"
EDWARD S. SUTHERLAND .....	"
JOHN McDONALD.....	"
THOMAS HALE .....	"
DONALD FERGUSON.....	Low Point.
ANGUS R. McDONALD.....	"
PETER CURRIE .....	"
JOHN HILL .....	"
ALEXANDER D. FERGUSON .....	Springhill.
MALCOLM BLUE .....	"
WILLIAM REESE .....	"
GEORGE WILSON .....	"
WILLIAM LORIMER .....	"
MALCOLM MCMILLAN .....	"

As night schools have been established at many of the collieries, it has been suggested that the schools of instruction for the year 1892 be not established until midsummer, and that the annual examination be held towards the close of the year. It has been found by experience that during the summer months proposing candidates, being in many cases actively engaged in coal mining, do not derive as much benefit from the schools of instruction as they would during the winter months, when work is not equally brisk.

## CERTIFICATES TO SHOTFIRERS, ENGINEMEN AND MINERS.

By legislation passed during the session of 1890, several important amendments were made to the Mines Regulation Act. Among them, Section 7 of the Act in question was amended to read as follows:—

"Where there is a shaft or inclined plane, or level in any mine, whether for the purpose of an entrance to such mine, or of a communication from one part to another part of such mine, and persons are taken up or down, or along such shaft, plane, or level by means of any engine, windlass, or gin driven or worked by steam, or any mechanical power, or by an animal or manual labor, a person shall not be allowed to have charge of such engine, windlass, or gin, or of any part of the machinery, ropes, chains, or tackle connected therewith, unless he be a male of at least eighteen years of age. Nor shall any person have charge of such engine, windlass, or other hoisting apparatus, unless he has undergone an examination by a person or board to be appointed by the Governor-in-Council, and holds a certificate of competency based on such examination."

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Certificates of service may be granted until January 1st, 1892, and this section shall not go into operation until that date. Sub-section 17 of Section 25, (General Rules), was also amended to agree with this.

Section 40 of the same Act was amended by adding the following :

“ And in no mine to which this chapter applies shall any person not now employed as a miner be ‘ given the picks ’ to work as a miner unless he has been employed in a mine, in some capacity for the space of one year. No one shall be given charge of a ‘ working face ’ in a mine who has not worked previously in a mine for the space of two years, nor shall any one now a miner be employed after the first of January, to mine coal, who is not a holder of a certificate of service ; and no one not now a miner shall be ‘ given the picks, ’ to work as a miner, until granted a certificate of competency after examination by the Board of Examiners appointed for the purpose of granting certificates as managers, overmen, or shot firers, or by an examining board to be hereafter appointed, who shall have power to frame laws and conditions under which said certificates shall be granted.”

Provision was also made that the men known as “ shot firers,” should also in future be holders of certificates, granted by the boards appointed for granting certificates to miners.

The following copy of an Order-in-Council, passed November 19th, 1891, will show the general instructions given to the Examiners :—

*Copy of an Order-in-Council, passed at Halifax on the 19th day of November, 1891, and approved by His Honor the Lieutenant-Governor.*

For the carrying out of sections 5, 11 and 15 of an Act to amend Chapter 8, Revised Statutes, “ Of the Regulations of Mines,” passed on the 19th day of May, A. D., 1891, it is ordered that :

Daniel Nicholson and Angus McLeod, of Cow Bay ; Andrew Lynk and Neil McKenzie, of Caledonia Mines ; Neil J. Gillies and Daniel Merlin, of Little Glace Bay ; John Caddigan and Coll McDona'd, of Bridaepport ; Bartholomew Connors and Angus R. McDonald, of Victoria Mines ; David Wilson and Edmund Cussack, of Reserve ; J. P. Boutlier and Isaac Greenwell, of Old Bridgeport and Gardener Mines ; Robert Way and William Diggins, of Sydney Mines (all of the County of Cape Breton) ;

John Fletcher and Edward B. Paul, of Springhill ; Thomas Blackwood and John Nolles, of Joggins (all of the County of Cumberland) ;

James Dunlop and William Gray, of Westville ; Neil A. Nicholson and Donald C. McDonald, of Stellarton ; Peter McKay and Neil McDonald, of Thorburn (all of the County of Pictou) ;

Be Examiners in their respective districts, as defined from time to time by the Commissioner of Public Works and Mines, for the purpose of granting Certificates to Miners and Shotfirers.

The persons so appointed shall form the Board of Examiners for their respective districts, and shall hold, as often as may be required,

examinations, at which persons desiring certificates of competency shall present themselves. The examinations shall not be by written answers to questions, unless so required by the Commissioner of Public Works and Mines. The examinations must show, to the satisfaction of the examiners, that the candidate possesses a knowledge of ventilation, modes of working coal, of timbering, of gas of safety lamps, of the requirements of the Mines Regulation Act and Special Rules, sufficient to enable him to work properly as a miner or shot-firer, before a certificate be granted.

In the case of applications for Certificates of Service, the examiners shall satisfy themselves of the *bona fides* of the applicants, and may require such proof of service as is necessary for carrying out the requirements of the law in this respect. The examiners shall not grant a certificate of service or competency to any person of known bad character, and a certificate may be cancelled or suspended by the Commissioner of Public Works and Mines, upon representation to him by a board of examiners that the holder of such certificate is guilty of drunkenness or other misconduct, and a board of examiners shall, to enable it to report to the Commissioner of Public Works and Mines, make enquiry forthwith into the truth of any such charge brought to its notice.

The fee to be paid by each person receiving a certificate shall be twenty-five cents, to be paid to the examining board, and to be divided between the two examiners. The forms of certificate, registration, etc., shall be such as the Commissioner of Public Works and Mines may from time to time direct. The certificates, books and forms will be provided for the boards of examiners, and an annual allowance of \$5.00 will be made to each board of examiners for postage and stationery, but all other expenses will be defrayed by each board.

The Commissioner of Mines may make such rules for the boards of examiners as may be found necessary for carrying on their work, and these rules may be, at any time, revoked or changed, or new ones made by the Commissioner of Public Works and Mines, who shall have power to do whatever is herein overlooked, or may hereafter be required, for the more efficient carrying out of the law.

It is further ordered, that:—

John Elliott, of Sydney Mines, in the County of Cape Breton ;  
James Floyd, of Westville, in the County of Pictou ; and  
Daniel Murray, of Springhill, in the County of Cumberland ;

Be Examiners for the purpose of granting certificates to engine men in their respective districts, as may from time to time be defined by the Hon. Commissioner of Public Works and Mines. With respect to persons appointed as examiners for granting certificates to engine-men, they shall be guided by the general instructions to examiners for certificates to miners, contained in this Order-in-Council.

No examiner shall grant a certificate of competency to any engine-man unless he be satisfied that he fully understands his work. In the case of any charge of drunkenness or misconduct on the part of a

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holder of a certificate as engineman made to an examiner, the Commissioner of Public Works and Mines may appoint some person, and the examiner and such person shall investigate such charge and report to the Commissioner of Public Works and Mines, who may thereupon suspend or cancel such certificate.

The examiners for granting certificates to enginemen shall receive pay at a rate not to exceed five dollars a day, including expenses, for each day occupied in examination business, in such manner as may be prescribed by the Commissioner of Public Works and Mines, who shall also fix the fee to be paid by each candidate receiving a certificate of service or competency.

The necessary forms, books, returns, etc., will be provided for each examiner, and an annual allowance of \$5.00 will be made to each examiner for postage and stationery, but all other expenses will be borne by the examiner.

The Commissioner of Public Works and Mines is hereby authorized to take such further steps as may be necessary for the proper carrying out of the provisions of the Act in this respect.

I believe that at this date all who were entitled to certificates of service have received them. As many miners in Cape Breton have not had any opportunity to familiarize themselves with fire damp, safety lamps, etc., instructions were given to the examiners to let each miner's certificate show what his attainments were in this respect, so that he could afterwards have his certificate changed on becoming practically acquainted with fire damp.

The legislation of the last session in respect to the use of gunpowder in mines was important. It having to a certain extent been admitted in the Pictou Collieries that gunpowder was not safe, the use of roburite, a so-called flameless explosive, was introduced. The explosion of last February at Springhill was directly attributable to gunpowder. The principle laid down in the legislation of last year was, that when mines exuded a certain amount of gas gunpowder should not be used while the miners were in the pit. The next question involved was the degree at which the line was to be drawn. It was suggested that districts or mines should be denied the use of gunpowder either in the *ipse dixit* of an inspector, or on the return air containing over a fixed percentage of gas. Finally, to adopt a standard intelligible to the managers and workmen, the two parties most directly interested, it was enacted that it should not be used in general practice at the working faces during two months after inflammable gas in quantity sufficient to show in a safety lamp has been found in three consecutive days in any mine. This provision would exclude gunpowder from nearly all the mines on the mainland, and possibly from some of the Cape Breton mines. It will be observed that no legislation has been proposed as to dusty coal mines, as the Royal Commission in England on Coal Dust in Explosives is taking evidence, it was thought advisable to see what conclusions were reached by it.

It is a question if the limit of safety laid down is restricted enough. It is apparent from a study of the limitation that a mine may have a very perceptible percentage of fire-damp floating in the

air, and yet if the ventilation is good and well conducted, and the workings carefully driven, it might be possible that gas would not be found on any three consecutive days. The consensus of independent mining opinion tends strongly to the conclusion that in any coal mine in which gas, even in small quantities, and dust are present, no gunpowder should be used. In this connection I append the report of the Prussian Fire Damp Commission on the Use of Explosives and Ventilation in Fiery Mines.

#### FUNDAMENTAL PRINCIPLES FOR THE WORKING OF FIERY MINES.

##### *1.—General Rules.*

1. Those mines are said to be fiery where firedamp has made its appearance during the course of the last two years.

2. In every fiery mine there ought to be at least two communications between the top and the bottom, separated the one from the other by an adequate mass of rock. One of these orifices should serve for the entry of the air, the other for its outlet. Exceptions to this rule are admissible under certain conditions.

##### *2.—Management of the Air-current.*

3.—In every fiery mine, it is necessary to make such arrangements as will ensure a regular ventilation, so that under normal conditions, firedamp shall not be allowed to accumulate in any accessible workings, and that also all the roads and working places shall be maintained in conditions suitable for working, and for circulating the air-current. Extensive mines should be divided into districts, independent of each other as regards ventilation. It is advisable to keep plans of the ventilation.

4. The exclusive use of natural ventilation is inadmissible. The same must be said of ventilation produced solely by means of the chimneys of steam generators. The use of ventilating furnaces can only be allowed under certain conditions, viz., that the furnace is supplied with pure air, a means of retreat afforded to the stoker in case of need, and arrangements made to prevent the inflammation of the air-current issuing from the mine, through contact with the gases of the furnace. The use of naked coal pans should be prohibited.

5. The amount of fresh air to be circulated per minute in a fiery mine should be calculated for each current, according to the average daily production of the working-place which it ventilates, at the rate of  $1\frac{1}{2}$  cubic metres per ton. If this volume is insufficient, in order to reduce the amount of firedamp in the return-airway to  $1\frac{1}{2}$  per cent. the amount should be increased. On the other hand, when the proportions of firedamp and carbonic acid in the return airway do not amount to  $1\frac{1}{2}$  per cent., the volume of fresh air may be reduced to 1 cubic metre per ton of coal brought down. In all cases the volume of fresh air should not be less than 2 cubic metres per man at the most populous station, one horse reckoning as four men.

6. The motors employed for circulating the air-current should be able, at any time, to immediately increase the minimum quantity of air mentioned above 25 per cent. The use of a registering and controlling apparatus is to be recommended.



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7. It is necessary (at least in new levels and shafts) to give to the main air roads a transverse section at least of 3 square metres. At all events the galleries and other ways traversed by the air-current should be proportioned in such a manner that, with a sufficient quantity of air, the rapidity of the air-current should not surpass 240 metres per minute at the entry, and 360 minutes at the outlet. Usually it is advisable, by increasing the size of the sections and dividing the current, to obtain still less rapidity. The auxiliary use of perforated airholes is likely to be of service.

8. The ventilation should be managed, both as a whole and in detail, in such a way that the current of fresh air descends from the surface by the shortest way, until it reaches the level of the working vein, and afterwards each current should flow in an upward direction through the different sections of the mine. Ventilation downwards should only be permitted in exceptional and particular cases.

9. The number of working-places that one and the same current may ventilate, must be determined by the fact that in its passage through the last working-place the current should still retain its desirable purity and freshness. Every current of air which has become considerably vitiated should be directed as quickly as possible towards the outlet of the mine, and should be prevented from passing through any other working-place.

10. Particular attention should be paid to the management of the air-current at the working-face. The ventilation of any gallery more than 20 m. in length should not be obtained by simple diffusion only. Headings should not be driven towards the rise without possessing independent means of ventilation; and in descending galleries, independent ventilation should be set up when the gallery has reached a length of 15 m. The gradient in direction of galleries should not be greater than 1 in 100. For ventilating isolated workings the Commission recommends the use of independent ventilation obtained by means of compressed air, and also by the Koerting and other apparatus of a similar sort.

Care should be taken to see that fans with arms are set up in the fresh air current. Every gallery or communication which has become useless for ventilation, should be closed up as hermetically and in as durable a manner as possible.

11. Air-gates should be so arranged that they close automatically, and should be set up at those points where an hermetic stoppage is necessary. If they must of necessity be frequently opened there should be two at least set up at an adequate distance each from the other, so that one of them may be kept continually closed.

Gates that have become useless should be done away with.

12. There should be no modification of any of the arrangements for the management of the ventilating currents without a special order from the person whose business it is to see after the matter. Any deterioration in a partition, gate, or pipe, or any irregularity in the ventilation should be immediately brought to the notice of the official.

13. Every inactive part of the mine should be closed up in such a way as to be easily recognized by the miners, and access to it prohibited.

14. The escape of firedamp from abandoned workings should be prevented either by damming them up completely or ventilating them.

15. Each working-place should be carefully inspected to make sure of the absence of firedamp before the men are allowed access to it.

16. In the event of stoppage or important derangement of the ventilation, the men should be quickly withdrawn from dangerous points, and not allowed to return before an examination has proved that the working may be resumed with safety. As soon as a sign of danger (serious accumulation of firedamp) is perceived in any working place whatever, the miners should close the way to it, warn their companions, and retire to inform the first official that they meet.

17. The work of driving headways, winning, &c., should not be undertaken, excepting where descending ventilation is allowable, until after the crosscut of the return airway has been driven in an upper level.

18. In every fiery mine there must be continuous and efficient inspection of the air-current, both as a whole and in detail, and, if necessary, this should be done by persons specially appointed.

### 3.—USE OF EXPLOSIVES.

*Complete Suppression of the Use of Explosives.*—There is no doubt that in the presence of firedamp, and especially of coal dust combined, the use of explosives constitutes a serious danger, and that if shot-firing were strictly prohibited it would prevent many cases of explosions; but such a course is open to many technical and economical objections.

From a technical point of view it must be recognized that in the majority of coal districts there is a certain abuse of explosives in the sense that in the working, properly speaking, of the coal, as well as in easily exploited coal seams, the use of explosives has replaced the ordinary use of the pick. It is evident that in a great number of cases it would be very desirable, even as regards the exploitation, to considerably limit the use of explosives, and moreover this could be done without any great difficulty. But it is otherwise with the prohibition of the use of explosives in the main, because then, besides the exploitation, it would affect the processes of driving headways, mining, &c., in the rock as well as in the coal. To renounce altogether the violent mechanical action of explosives would naturally necessitate a much greater amount of hard labour, and would doubtless result in a much greater total of accidents; in certain circumstances it is probable the number might surpass the total of fatal accidents caused by explosives and explosions of fire damp. Also, winning and driving headways in very hard coal or rock without the aid of explosives would require much longer time, which would also be a new source of danger, and would be still further augmented by the fact that the miner would be exposed to the danger of fallings in, slips, &c.,



whereas with the aid of explosives the rock or coal is brought down in his absence.

If the prohibition of explosives were exclusively limited to working the coal in the seam, as was at first proposed by the Scientific Technical Committee of the Commission, yet a measure of this sort would be useless, because the working in the coal and in the stone is so frequently mixed together that a distinction is hardly possible. Besides, it is not unusual for explosions of fire damp and coal dust to take place when working in the rock, and, in any case, this would not ensure absolute safety. To these technical considerations must also be added important considerations from an economical point of view, and first of all would be the increased cost of working which would inevitably result from such a measure. At the conclusion of many comparative trials, made with this object in view, there was reason to fear that the total prohibition of the use of explosives in fiery mines would not only render unexploitable numerous beds which are now being worked, but that also in many mines which are productive at the present time it would have been equivalent to the total prohibition of the whole of the workings. Also, the interdiction of explosives would lead to important differences in the conditions of competition, because it would affect different coal districts, and even the various mines in each of them, very unequally.

In the presence of these difficulties the absolute prohibition of the use of explosives in coal mines must only be considered as an extreme measure, undertaken in order to ensure the safety of mines extraordinarily dangerous, and consequently the majority of the Commission resolved not to recommend such a general measure. And in arriving at such a conclusion the Commission was guided by a fresh consideration—namely, that independently of limiting the use of explosives as much as possible, the danger of explosives, as was demonstrated at the Neunkirchen experiments, may be greatly diminished, even if not entirely removed, by abolishing the use of gunpowder, and replacing it, using certain special methods of precaution, by explosives of rapid combustion, or explosives of great rending force.

In comparison with what are termed "Fiery" Mines here it is interesting to note that the Russian Commission classifies a mine as "fiery" when fire damp has made its appearance in it within two years.

Under the provisions of the section amending the explosives clause, the following gentlemen were associated with the inspector with a view of finding what explosives could be considered safe to use instead of gunpowder:—Henry Rae, Springhill; Thos. Johnston, Westville; H. S. Poole, Stellarton; R. H. Brown, Sydney Mines; Robert Crosby, Cow Bay.

Several meetings were held at Stellarton, and experiments made by the Commission and by a Committee in Cape Breton and Pictou County mines.

The general value of the explosives tested before the Commission at Stellarton in September, 1891, may be gathered from the following selection of experiments conducted under the supervision of members of the Commission :

Two parties submitted explosives. The Acadia Powder Company of Halifax submitted two grades of a dynamite explosive, rendered, it was claimed, less local in its action and flameless by the addition of certain chemicals. As their explosive was experimental its composition was not considered at the outset. The local branch of the English Roburite Company submitted roburite as manufactured by them in Halifax, giving its composition as 18 per cent. of chlorodi nitro benzol and 82 per cent. of nitrate of ammonia. It may be remarked here that the Secretary of the English company intimated later that the compound as manufactured there did not contain over 12½ per cent. of chlorodi nitro benzol, and that presumably it was made in Halifax of the same strength. The Commission, up to the date of its preliminary report, has dealt with the question of composition only in a general manner.

It may be remarked that in all the experiments the shots were fired with detonators ignited by a Victor battery.

*1st Experiment.*—Two 6 oz. cartridges of roburite were placed on the ground six feet apart on the same wire, and covered with a few shovels full of dry slack coal. Both shots gave a flash.

*2nd Experiment.*—One 6 oz. cartridge of grade "B," and a 3 oz. cartridge of grade "C" of the explosives of the Acadia Company, were connected to the same wire, placed on the ground as before and covered with slack. On firing there was a flash from grade "C" cartridge, but none from grade "B" cartridge.

*3rd Experiment.*—A 4 oz. cartridge of roburite covered with four inches of slack coal gave a flash on being fired.

*4th Experiment.*—A 4 oz. cartridge of grade "B" explosive of the Acadia Company, covered with four inches of slack, gave no flash on being fired.

The experiments were made on a dark night, in a space shaded by trees, and under conditions as far as possible similar.

These experiments were continued in the McGregor pit of the Acadia Coal Company. A number of holes were bored in the high side of a level in firm coal, in a five foot seam, about half way between the roof and floor. The holes were 3 feet 6 inches deep and from 1½ to 1¾ inches in diameter.

*1st Experiment.*—Charge 7 oz. explosive "B," hole tamped with clay for 25 inches. Shot blew the outside tamping off for a depth of 18 inches. No light visible.

*2nd Experiment.*—Charge 4 oz. roburite. Hole tamped with clay for 20 inches. Shot blew out tamping. No light visible.

*3rd Experiment.*—Charge 4 oz. explosive "B." Hole tamped with clay for 20 inches. Shot blew out tamping. No light visible.

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*4th Experiment.*—Charge 7 oz. explosive “B.” No tamping. Shot gave bright flash.

*5th Experiment.*—Detonator of Acadia Powder Company fired outside the hole alone and uncovered, gave flash.

*6th Experiment.*—A four ounce cartridge, explosive “B,” with detonator in rear of cartridge and pushed into back of hole, gave slight flash on being fired.

In the opinion of those witnessing these experiments the flash observed when the explosives were fired without tamping was not greater than that due to the detonator, except, perhaps, in the case of the fourth experiment in the McGregor pit. It is probable that the greater or less amount of flash observable in a number of experiments may be due either to a lack of uniformity of the explosive mixture, or to the detonators not in each case occupying the same position in the cartridge. The fact has been elicited during the observations of the Commission that the explosives fired unconfined did not give a flame, but a very brief flash of light. The blown out shots did not flame nor did they give a light, a very slight tamping being apparently enough to delay the progress of the explosion long enough for the flash to have disappeared when rupture of the enclosing matter took place.

A number of experiments were made in this pit substituting the new explosives for gunpowder in the ordinary working of the coal. These showed that the work could be performed as readily with them as with gunpowder after the miners understood its strength and the proper way to handle it. I may mention here that roburite has for some time replaced gunpowder in the adjoining Intercolonial Colliery, and is reported as doing the work equally well and at lessened cost per ton. One example only of these experiments in the regular working places of the McGregor Colliery will be given, as it will serve to show the nature of the rest.

Working place 15 feet wide. Bench 6 feet by 7 feet by 3 feet 9 inches high. Hole 5 feet deep, 2 feet 6 inches from the high side, level, and on bottom of seam. Charge 18 oz. “B” explosive. First half of hole stemmed with clay, rest with slack coal. The shot was satisfactory. Coal hard and compact, and the bench had a layer of stone on top about 9 inches thick.

A sub-committee, together with agents of the manufacturers of explosives, visited Cape Breton and experimented with the explosives before the Commission in most of the mines. The tests were the subject of much interest to managers and men, and seemed to demonstrate that after a little experience it could readily replace gunpowder.

The Committee concluded their report in the following words:—

“At some of the mines we found an existing prejudice against the introduction of any new explosive. The experiments convince us that in either roburite or flameless powder we have explosives practically flameless, and therefore, that can be used with comparative safety where powder cannot be used except at a certain risk. In no

single instance, and there was every kind of shot, did any one notice flame. A great point with some of the miners is the cost. Roburite in small shots may be rendered more expensive than powder on account of the caps. The agent for the flameless powder asserts that explosives can be made of any strength, and at a cost very little higher than powder. It may be difficult to find an explosive that will satisfy the workmen, or do equally as well as powder, yet we are convinced that with a little experience and patient tests, either of the explosives we tried will be excellent substitutes for powder, with this tremendous advantage that they are much safer to use in all cases, and more especially in fiery mines."

The sittings of the Commission were renewed at Stellarton on December 15th. Further evidence was taken, and correspondence submitted which had taken place between the Inspector of Mines and various manufacturers of explosives. Samples of Ammonite, an explosive already referred to, had been forwarded from England, and tested in the Sydney mines, Cape Breton county, with results not altogether satisfactory, but not discouraging when the want of experience is taken into consideration.

It was agreed that the following preliminary report be submitted to the Government:—

STELLARTON, *December 16th, 1891.*

*To the Honorable the Lieutenant-Governor in Council:*

SIR,—We, the undersigned, associated with the Inspector of Mines, under the provisions of the Mines Regulation Act, Chapter 8, Revised Statutes, Fifth Series, as amended, section 25, sub-section 7, par. (e) viz:—

Provided, however, if at any time the Inspector of Mines, together with any persons experienced in the composition or use of explosives, who he may associate with himself for the purpose, shall report that any explosive is free from danger, the Lieutenant-Governor may, by Order-in-Council, determine that the restrictions of sub-section (d) of this section shall not apply to such explosive, and in such case, such explosive may be used so long as said Order-in-Council remains in force."

beg respectfully to make the following preliminary recommendations as to the freedom from danger of certain detonating explosives which have been submitted to us, and incorporate therewith some recommendations calculated in our opinion to tend to greater safety in the use of such explosives.

We presume that the sub-section under which we are appointed is qualified in the same manner as the remainder of the General Rules collected under section 25 of the Mines Regulation Act, by the prefix to said section, viz., "so far as is reasonably practicable."

We have examined witnesses, and have experimented with various detonating explosives in the Pictou Collieries, and a committee has also experimented with detonating explosives in several of the Cape Breton mines. This testimony and reports are herewith submitted.

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We have selected out of the detonating explosives submitted two which are apparently safe, and adapted for coal mining in this province. In this connection it may be remarked that the enquiry has been confined solely to the question of safety in blasting, that no enquiry has been made into the question of cost, or of safety in manufacture, transportation, or storage. No opportunity has yet been afforded for ascertaining the composition of these two detonating explosives, pending the investigation of certain changes in the mixtures calculated to increase their safety.

It is recommended that no detonating explosive be allowed to be used in coal mines without a license first obtained from the Commissioner of Mines, authorized thereto by an Order-in-Council.

That the four explosives approved by the French Minister of Public Works, August 1st, 1890, be allowed to be used subject to the regulations herein recommended. These are :—

1. Mixtures of Dynamite No. 1 (75 per cent. of nitro-glycerine and 25 per cent. of silica) and nitrate of ammonia, in which the proportion of dynamite should not exceed 40 per cent. for stone work, and 20 per cent. for coal getting ;

2. Mixtures of blasting-gelatine (91.7 per cent. of nitro-glycerine, and 6.3 per cent. of nonnitric cotton), and nitrate of ammonia, in which the proportion of blasting-gelatine should not exceed 30 per cent. for stone work, and 12 per cent. for coal getting ;

3. Mixtures of octonitric cotton with nitrate of ammonia, in which the per centage of gun cotton does not exceed 20 per cent. for stone work, and 9.5 per cent. for coal getting ;

4. Mixtures of dinitro-benzol and nitrate of ammonia, in which the proportion of dinitro-benzol does not exceed 10 per cent. for stone work.

That any other detonating explosive fulfilling the following conditions may be licensed :—

1st. The products of its detonation should not contain any combustible matter, such as nitrogen, carbon monoxide, solid carbon, etc.

2nd. Its temperature of detonation as calculated by the formulæ, adopted by the French Commission referred to, should not exceed 1900 degrees C. for explosives used in stone work, nor 1500 degrees C. for those employed in coal blasting.

It is recommended that in all cases the tamping should exceed 20 inches in length, that in the case of blasting in stone the tamping should be of a plastic material, but at present we are not prepared to make any recommendation as to the material to be used in tamping shots fired in coal. Any manufacturer desirous of introducing into the coal mines an explosive, shall file with his application for license a statement giving full particulars of the composition of the explosive ; this statement not necessarily for publication.

The Inspector, or any person authorised by the Commissioner of Public Works and Mines, shall have power to take from the maker,



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vendor, or consumer, samples of any licensed explosive, and should such explosive prove to differ from its registered composition, or not to fulfill the requirements recommended by the Commission, the license therefor granted by the Commissioner may, upon his report, be cancelled or suspended by the Lieutenant Governor-in-Council.

It is recommended that all explosives be fired by electrical fuse by low tension electricity.

It is recommended that the use of high explosives be permitted, where tamping by water can be used in the proportion by bulk of four per cent. of water to one of explosive.

While pleased with the practical results with roburite as seen by us, we find that it contains nearly ten per cent. of nitrate of ammonia less than the French Minister of Public Works allows in his decree of August 1st, 1890, as a safe proportion for roburite to be used in stone blasting (no reference being made by him to the included chlorine), and recommend, in view of the satisfaction hitherto attending the use of this 18 per cent. roburite in Nova Scotia, that its use be allowed for four months under the regulations herein contained, in order that the manufacturers may be enabled to produce a material approaching more closely in composition that recommended by this Commission. A similar recommendation is made in the case of the so-called "Flameless Explosive" of the Acadia Powder Co.

We wish it to be understood that we do not consider that the use of detonating explosives should in any way lessen the necessity for the observance of the customary regulations respecting the firing of charges in the presence of gas, examination of contiguous places, etc.

All of which is most respectfully submitted for your Honor's consideration.

The Commission adjourned.

Since the presentation of this preliminary report, experiments are being carried on with ammonite. The behaviour of roburite in the Pictou Collieries is being carefully studied. The Acadia Powder Company have secured patents for Canada, and are experimenting with a mixture having dynamite for its base so prepared that it is hoped that dampness will have no injurious effect on the explosive when prepared for use in cartridges.

The Acadia "explosive," at present substituted for the grade "A" and "B" explosives already referred to, is simpler in composition. At present it is guaranteed to contain less than twenty per cent. of dynamite, and to come within the limit laid down by the French government. The "watering" ingredient is nitrate of ammonia with the addition of a chemical, which stable in itself, is calculated to neutralize any trace of acid that may be present. So soon as these experiments, and the study of the practical behaviour of the explosives is finished, the Commission hope to be able to recommend to the Government two safe explosives capable of replacing gunpowder, and not excessive in cost.

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## IRON MINING.

The past season has exhibited a general increased interest in iron smelting, etc. The Londonderry Iron Company have rebuilt one of their furnaces and raised it to a height of seventy-five feet instead of sixty-three, as originally built. Two new kilns for roasting the Spathic ores found so abundantly on the company's property, and having a capacity of 100 tons daily, have been erected.

The New Glasgow Iron, Coal & Railway Company expect to have their furnace in blast next June. Their railway to Bridgeville is about completed, and their development work secures them an abundant supply of good ore. The furnace is 65 feet high; bosh 25 feet 6 inches; hearth 9 feet 9 inches. Three hot blast stoves. Two blowing engines of 1,000 horse power each. Capacity, 15,000 feet of air per minute. Anticipated yield, 100 tons per day. The coke ovens are of the Coppee pattern, and are likely to be the first of their pattern to go into operation in America. Capacity of each oven about 6 tons, making 70 to 80 tons of coke per day. The coke is all to be crushed and washed before coking, and the ash reduced to about 4 or 5 per cent. in the coal.

The Pictou Charcoal Iron Company have located themselves at Bridgeville, on the line of the New Glasgow Company's Railway, and the object of their work may be gathered from the following remarks of Mr. E. J. Spostedt, Mines Manager:—

“Our object is to establish a charcoal iron plant here at Bridgeville, and to use the brown ores principally, and to produce a charcoal iron specially adapted for car wheel making, and also for especially strong machine castings. With this object in view we have purchased mining rights of iron ore, limestone and manganese ore, and some six thousand (6000) acres of hardwood land. The size of our furnace will be 11 feet bosh, and 50 feet in height, and the estimated output for the first few years, five thousand (5,000) tons per annum.”

The following memorandum of the operations at Torbrook will be of interest, as marking the commencement of a mining industry in Annapolis County, which promises to be valuable and permanent:—

“About the beginning of March last active operations were first commenced at Torbrook, Annapolis County, on the bed of red hematite ore, discovered there during the previous year. The ore extends along the base of the South Mountain, the strike being about N. 60° E., and has been traced on the surface from Nictaux Falls eastwards to the Kings County line, a distance of 4 miles. The bed has an average thickness of 5½ feet clear ore, and is so tilted up as to dip at an angle varying from 70 to 80 degrees. Both the hanging and foot walls are of a variegated talcose state, very light in color and between eighteen to twenty-four inches thick. These walls form a fairly good support for the time being, although slightly soft. The country rock is of a dark bluish state, probably of upper Devonian age. A fair sample of the ore yields about 60 per cent. metallic iron; silica, 9 to

10 per cent.; lime, 4 to 5 per cent; phosphoric acid, 0.3 per cent.; sulphur, trace.

When decided operations were first entered upon, a shaft was sunk in the ore 80 feet deep, levels driven east and west, and the ore taken out by back stoping. Inside of a month another shaft was sunk, about 350 feet from the first, and the ore mined by underhand stoping. A hoisting engine was soon got into position, and ore raised at the rate of 25 tons daily. In the spring a survey was made, and in the summer a railroad constructed from Wilmot station to the mines at Torbrook, a distance of 3 miles. The track runs alongside of the shafts. The cars being loaded from chutes. Since the construction of this branch line, two new shafts have been put down, and new hoisting gear has replaced the old. At present we have in operation one four drum hoist, and one single drum hoist. Three small pumps are required to free the mine from water. Steam is supplied to engines and pumps from three boilers. Some slight difficulty has been experienced with faults; but these seem to grow smaller as the depth increases. Some having already disappeared even at the comparatively slight depth of the present workings.

All the ore is shipped via Windsor Junction to Londonderry. Last month (January), 105 cars were loaded at Torbrook, in all about 1,650 tons."

## IRON ORE.

The following figures show the production of iron ore during the year:—

	Tons.
Pictou Charcoal Iron Co., Bridgeville, Pictou Co. ....	681
Londonderry Iron Co., Londonderry, Col. Co. ....	46,350
Ore from Springville Pictou Co. ....	113
“ Bridgeville “ .....	680
“ Pugwash, Cumberland Co .....	214
“ Torbrooke, Annapolis Co .....	7,273
New Glasgow I. C. & Ry. Co., Springville, Pictou Co.	2,000
Total .....	57,311

## COPPER.

There is little new to report. A lease to work Copper ore at Brierly Brook was applied for by B. G. Gray and J. A. Grant.

At Coxheath a good deal of work was done. The following will give an idea of the increased value shown by last season's operations at this important mine:—

“ The principal mining development at the Coxheath mine during the year has been the sinking of No. 2 shaft to the 320 feet level; at



that depth a cross-cut was driven to the north, which cut the "B" vein at 89 feet from the centre of the shaft, which is about the same distance from the shaft at which this vein was encountered in the 250 feet level; the hanging wall was cut at 141 feet from the shaft. The main ore body in the vein is about 17 feet in width, and the ore averages in quality fully as high grade as in the upper levels; low grade ore is scattered throughout the remainder of the vein on this level, and the outlook is certainly encouraging for values entirely out of the usual order. The company intend to sink this shaft to the 400 feet level before hoisting ore for market.

On the New Mountain vein, No. 3 shaft was sunk to its first level at 100 feet, but the vein was not driven upon when operations closed for the season. This vein is of great promise, and several other explorative pits were sunk on it at various points, with good results; and the surface work has located the point of junction of this vein with vein "B" at a location about 1700 feet easterly from No. 3 shaft, and 1300 feet easterly from No. 2 shaft.

A new residence has been erected for the mining captain and staff, and a grade crossing of the Cape Breton railway been granted by the Dominion authorities.

On the Argyle area work was confined to additional surface prospect work. In August the mine was visited and reported upon by Geo. Grant Francis, M. E., of London, and Mr. Walter Ingalls of the staff of the "New York Engineering and Mining Journal;" at that time it was estimated that the ore on the dumps amounted to about 3000 tons, with a total amount of ore in sight of 42,732 tons; since then the cutting of B. vein on the 320 feet level has increased the ore in sight to about 50,000 tons.

The following is the labor return for 1891:

Skilled labor, underground.....	5,941	days.
Unskilled " " .....	3,867	"
Skilled " overground.....	2,930	"
Unskilled " " .....	4,492	"
Coal teamster, &c.....	1,249	"

Total..... 18,679 days."

During the year Mr. Peters visited the mine and perfected plans for concentrating and smelting works. As usual the work at the mine has been lessened during the winter, but it is hoped that in the spring the construction of the railway will be proceeded with.

## GYPSUM.

The following figures show the amount of gypsum exported during the past year:

### GYPSUM EXPORTS, 1891.

	Tons.	Value.
Halifax .....	1,200.....	\$ 1312
Baddeck .....	16,000.....	.....
Windsor .....	118,969.....	116,479
Cheverie .....	17,330.....	13,433
Walton .....	7,125.....	7,001
Arichat .....	510.....	510
Mabou.....	800... ..	.....
<hr/>		
Total.....	161,934 .....	.....

The Mabou Gypsum Company report that they have opened up two new quarries; extended old wharf; erected new wharf; quarried about 7000 tons rock; erected new steam mill, 35' x 60'; ground about 500 tons.

## MANGANESE.

Mr. J. W. Stephens took out a few tons from his Tenny Cape mine. A few tons were shipped from the Onslow mine; and Mr. E. T. Moseley of Sydney, reported having shipped 28 casks of 90 per cent. ore on St. Peters. It is anticipated that a larger output will be made during the year 1892.

I have the honor to remain, yours obediently,

E. GILPIN, JR.,

*Inspector of Mines.*

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	121 425	109,071	106,230	85,006	131,574	26,581	.....	.....	359,229	220,658
2nd    "        .....	132,843	116,810	112,776	99,652	318,132	267,707	156	150	563 907	484,319
3rd    "        .....	127,537	110,600	115,337	115,699	409,494	483,171	.....	.....	652,368	709,470
4th    "        .....	140,173	125,786	113,826	104,739	215,121	204,933	160	40	469,280	435,498
Total .....	521,978	462,267	448,169	405,096	1,074,321	982,392	316	190	2,044,784	1,849,945
1890.....	490,149	438,608	475,625	430,509	1,018,227	916,994	.....	.....	1,984,001	1,786,111

## MINES REPORT.

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.		TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.			
NOVA SCOTIA :															
Land Sales.....	60,492	44,041	11,199	121,858	104,751	...	9,210	9,001	.....	190	.....	191,750	157,793	11,199	360,742
Sea Borne.....	56	368	.....	32,948	5,541	.....	185,435	32,901	21,746	.....	.....	218,439	38,810	21,746	278,995
Nova Scotia Total..	60,548	44,409	11,199	154,806	110,292	.....	194,645	41,902	21,746	190	.....	410,199	196,603	32,945	639,737
New Brunswick ..	91,788	23,540	38,065	24,314	7,603	.....	41,528	2,477	..	.....	.....	157,630	33,620	38,065	229,315
Newfoundland ....	.....	.....	.....	1,636	46	.....	101,837	4,167	931	....	.....	103,473	4,213	931	108,617
P. E. Island .....	.....	.....	....	18,458	24,452	....	10,105	13,959	499	.....	.....	28,563	38,411	499	67,473
Quebec .....	53,508	19,756	110,309	59,771	3,548	.....	428,280	95,957	6,177	.....	.....	539,539	119,261	116,486	775,286
West Indies .....	.....	.....	.....	.....	.....	.....	4,086	.....	.....	.....	.....	4,086	.....	.....	4,086
United States ....	.....	9,087	58	.....	170	.....	2,585	13,531	.....	.....	.....	2,585	22,788	58	25,431
Total.....	205,844	96,792	159,631	258,985	146,111	.....	781,046	171,993	29,353	190	.....	1,246,065	414,896	189,984	1,849,945

## COAL.—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1891.	Year 1890.
Nova Scotia:						
Land Sales....	91,478	85,365	77,732	106,167	360,742	348,502
Sea Borne ....	15,905	62,880	108,246	91,964	278,995	253,454
N. S. Total .....	107,383	148,245	185,978	198,131	639,737	601,956
New Brunswick..	40,215	48,198	77,399	63,503	229,315	224,776
Newfoundland ..	6,194	23,315	39,552	39,556	108,617	96,033
P. E. Island.....	.....	15,714	32,930	18,829	67,473	55,843
Quebec .....	64,806	239,062	360,695	110,723	775,286	751,931
West Indies ....	.....	855	2,495	736	4,086	4,718
United States....	2,060	8,930	10,421	4,020	25,431	50,854
Other Countries..	.....	.....	.....	.....	.....	.....
Total .....	220,658	484,319	709,470	435,498	1,849,945	1,786,111
1890 .....	213,629	472,291	604,858	495,333	1,786,111	.....

## COAL.—GENERAL STATEMENT.

1891.	Produce.	Sold.	Colliery Consumption.
1st Quarter.....	359,229	220,658	36,950
2nd " .....	563,907	484,319	51,755
3rd " .....	652,368	709,470	46,256
4th " .....	469,280	435,498	40,022
Total .....	2,044,784	1,849,945	174,983
1890.....	1,984,001	1,786,111	161,240

## MINES REPORT.

## COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR 1891.

COLLIERY.	Raised.	SOLD.			Total Sold.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
CUMBERLAND Co.							
Chignecto .....	960	400	380	.....	780	20	130
Jo4gins .....	60,056	50,280	3,592	.....	53,872	3,830	2,069
Minudie .....	1,667	1,358	65	.....	1,423	30	.....
Springhill .....	459,395	153,806	92,755	159,631	406,192	29,327	9,990
Pictou Co.							
Acadia .....	286,372	155,621	93,492	.....	249,113	27,854	7,698
Black Dia' nond .....	18,144	12,113	5,658	.....	17,771	200	173
East River .....	2,925	2,125	.....	.....	2,125	670	130
Intercolonial .....	140,728	89,126	46,961	.....	136,087	7,645	2,656
CAPE BRETON Co.							
Bridgeport .....	30,897	30,328	2,219	.....	32,547	295	383
Caledonia .....	159,985	97,492	47,503	.....	144,995	2,050	1,465
Gardner .....	18,746	14,689	2,416	.....	17,105	730	268
Glace Bay .....	117,767	101,142	9,070	.....	110,212	6,350	556
Gowrie .....	158,064	123,214	29,153	.....	152,367	5,171	4,909
International .....	133,179	88,505	36,172	.....	124,677	5,672	2,807
Ontario .....	3,111	2,709	.....	.....	2,709	326	76
Reserve .....	170,844	134,306	20,350	.....	154,656	10,847	4,119
Sydney .....	170,691	130,682	15,963	.....	146,645	13,784	9,673
Victoria .....	111,037	57,979	9,147	29,353	96,479	9,250	3,719
INVERNESS Co.							
Broad Cove .....	156	150	.....	.....	150	.....	6
Rankin .....	160	40	.....	.....	40	80	15
Total .....	2,044,784	1,246,065	414,896	188,984	1,849,945	124,131	50,852

# MINES REPORT.

Statement of the Number and Classes of Men employed, etc., at each Colliery during the year 1891.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		No. of tons per cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.
	Skilled Labor.	Labors.	Boys.	Days' Labor.	Skilled Labor.	Labors.	Boys.	Days' Labor.	Skilled Labor.	Labors.	Boys.	Days' Labor.	Persons.	Days' Labor.			Above.	Below.	
<i>Cumberland Co.</i>																			
Chigrecto .....	2	42	19	324	1	4		1112	3	8		1321	7	1436	480	17	4	9	55
Joggins .....	96	350	143	38597	14	35	4	11840	5	2		2125	221	51758	625	265	21	72	226
Springhill .....	532	350	143	263064	113	185	40	85993					1370	351182	863	1780			258
Stanley .....	3	1		255	2	2		270					8	525			1		
<i>Pictou Co.</i>																			
Acadia .....	296	292	82	155295	81	150	34	80193	8	11		4126	954	239614	961	1547	16	19	185
Black Diamond .....	9	13	3	4811	4	6	1	2183					36	6994	2016	137	1	1	132
East River .....	5			1437	2			693					7	2130	585	11			252
Intercolonial .....	163	68	47	69189	39	56	12	32852	3	3		1739	391	103780	863	574	7	10	245
<i>Cape Breton Co.</i>																			
Bridgeport .....	24	5	6	11314	2	5		2744	1	1		542	44	14600	1287	132	2	6	234
Caledonia .....	162	22	41	55156	25	50	10	19507	20	2	6	6318	338	78981	987	653	7	35	245
Gardiner .....	50	6	6	10206	2	8	2	3185	7	5	1	2760	87	16151	374	94	2	5	198
Glace Bay .....	136	17	40	40358	51	55	26	9684					325	49042	865	518	6	32	227
Gowrie .....	150	23	43	46028	30	70	26	34313					342	80341	1053	1663	11	25	95
International .....	153	29	38	47111	34	100	18	38623					372	85734	870	686	7	33	194
Ontario .....	9	3	1	1503	2	6	1	6512					22	8015	345	26	2	2	119
Reserve .....	96	30	26	75951	22	46	7	39415	1			241	228	115007	1779	675	4	12	253
Sydney .....	251	50	110	98197	62	86	46	53072					605	151269	680	687	8	59	247
Victoria .....	132	86	28	54966	10	75	21	31828					352	86794	841	415	7	12	267
<i>Inverness Co.</i>																			
Broad Cove .....	2	1	1	140	1			43					5	183	78				186
Rankin .....	8	4											12		20				
<i>Richmond Co.</i>																			
Sea Coal .....	4	6		688	5	5		750					20	1438					
	2283	1048	634	972590	502	944	248	453812	48	32	7	19172	5746	1341694			106	332	

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1871	165,431	\$1 25
1851	116,274	"	1872	154,092	75
1852	87,542	"	1873	264,760	"
1853	120,764	"	1874	138,336	"
1854	139,125	Free.	1875	89,746	"
1855	103,222	"	1876	71,634	"
1856	126,152	"	1877	118,216	"
1857	123,335	"	1878	88,495	"
1858	186,743	"	1879	51,641	"
1859	122,720	"	1880	123,423	"
1860	149,289	"	1881	113,728	"
1861	204,457	"	1882	99,302	"
1862	192,612	"	1883	102,755	"
1863	282,775	"	1884	64,515	"
1864	347,594	"	1885	34,483	"
1865	465,194	"	1886	66,003	"
1866	404,252	"	1887	73,892	"
1867	338,492	\$1 25	1888	30,198	"
1868	228,132	"	1889	29,986	"
1869	257,485	"	1890	50,854	"
1870	168,180	"	1891	25,431	"

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.



# MINES REPORT.

G

## *Nova Scotia Coal Sales, from 1785 to 1891 (Inclusive.)*

Year.	Sales.	Total	Year.	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143	1848	187,643		
1793	1,926	1849	174,592		
1794	4,405	1850	180,084		
1795	5,320	1851	153,499		
1796	5,249	1852	188,076		
1797	6,039	1853	217,416	2,399,319	
1798	5,948	1854	234,812		
1799	8,947	1855	238,215		
1800	8,401	1856	253,492		
1801	5,775	1857	294,198		
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		4,927,339
1804	5,976	1860	322,593		
1805	10,130	1861	326,429		
1806	4,938	1862	395,637		
1807	5,119	1863	429,351		
1808	6,616	1864	576,935		
1809	8,919	1865	635,586		
1810	8,609	1866	558,520	7,317,430	
1811	8,516	1867	471,185		
1812	9,570	1868	453,624		
1813	9,744	1869	511,795		
1814	9,866	1870	568,277		
1815	9,336	1871	596,418		
1816	8,619	1872	785,914		
1817	9,284	1873	811,106	13,910,136 1,849,945	
1818	7,920	1874	749,127		
1819	8,692	1875	706,795		
1820	9,980	1876	634,207		
1821	11,388	1877	697,065		
1822	7,512	1878	693,511		
1823	27,000	1879	688,628		
1824		1880	954,659		
1825		1881	1,035,014		
1826	12,600	1882	1,250,179	33,146,117	
1827	12,149	1883	1,297,523		
1828	20,967	1884	1,261,650		
1829	21,935	1885	1,254,510		
1830	27,269	1886	1,373,666		
1831	37,170	1887	1,519,684		
1832	50,369	1888	1,576,692		
1833	64,743	1889	1,555,107	Total.....	
1834	50,813	1890	1,786,111		
1835	56,434	1891	1,849,945	Total.....	
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198	839,954			

### SUMMARY.

1785 to 1790 .....	14,349	1841 to 1850 .....	1,533,798
1791 to 1800 .....	51,048	1851 to 1860 .....	2,399,319
1801 to 1810 .....	70,452	1861 to 1870 .....	4,927,339
1811 to 1820 .....	91,527	1871 to 1880 .....	7,317,430
1821 to 1830 .....	140,820	1881 to 1890 .....	13,910,136
1831 to 1840 .....	839,954		

GOLD—GENERAL STATEMENT FOR YEAR 1891.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per Ton.			Total Yield of Gold.		
					Oz.	Dwts.	Grs.	Oz.	Dwt.	Gr.
Tangier .....	2	3316	1	42	0	6	6	13	3	12
Whiteburn .....	1	5751	2	803	1	0	6	813	12	2
Central Rawdon .....	1	4404	1	510	0	1	8	342	0	0
Killag .....	1	5375	1	379	0	18	11	354	6	16
Oldham .....	2	15085	2	2019	1	9	0	2909	10	13
Caribou } .....	3	14426	4	5489	0	5	1	1486	14	21
Moose River } .....	1	5595	1	1823	0	7	15	698	9	0
Wine Harbour .....	3	11065	3	1611	0	7	11	602	4	0
Waverley .....	1	7228	1	2432	0	6	13	800	3	0
Lake Catcha .....	2	18522	2	4562	0	12	16	2396	10	12
Fifteen Mile Stream .....	3	10154	4	1751	1	13	20	2965	5	4
Uniacke .....	2	5728	3	863	1	11	10	1361	1	0
Montagne .....	2	9651	4	829	1	3	2	957	3	4
Stormont .....	2	17520	2	4826	0	19	12	4664	13	17
Malaga .....	1	10580	1	5210	0	5	9	1406	0	0
Salmon River .....	4	2537	2	464	0	5	3	119	5	0
Sherbrooke .....	3	2444	5	1399	0	5	3	361	0	4
Unproclaimed, etc. ....	34	149381	.....	35212	..	..	..	22251	2	9



MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	OLDHAM.					CARIBOU AND MOOSE RIVER.								
	No. of Mine.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mine.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January .....	1	1412	56	139	106	1	0	3	1140	45	62	78	0	0
February .....	1	1233	49	135	786	10	0	3	1142	45	181	155	9	12
March .....	1	1302	52	69	174	14	0	3	1196	47	285	148	6	9
April .....	1	1214	48	27	1	0	0	3	1348	53	529	168	19	3
May .....	1	1132	45	32	2	12	11	3	1559	62	488	146	14	12
June .....	1	1202	48	.....	0	3	16	3	1470	58	674	137	4	12
July .....	2	774	30	385	186	4	10	3	876	35	520	188	15	21
August .....	2	1410	56	4	15	6	0	3	810	32	634	178	12	12
September .....	2	1476	59	14	23	11	0	3	896	35	802	127	11	15
October .....	2	1299	53	423	1316	9	0	3	1387	55	723	51	3	12
November .....	2	1313	53	472	183	15	0	3	1345	53	101	26	8	9
December .....	2	1318	52	319	113	4	0	3	1256	50	490	79	9	0
Total .....	2	15085	.....	2019	2909	10	13	3	14426	.....	5489	1486	14	21

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	LAKE CATCHA.					FIFTEEN MILE STREAM.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	1	572	22	.....	.....	.....	.....	2	1321	52	360	227	0	0
February .....	1	785	31	233	25	0	0	2	1339	53	358	232	0	0
March .....	1	781	31	299	58	5	0	2	1504	60	471	271	18	0
April .....	1	837	33	301	63	0	0	2	1772	90	555	227	18	0
May .....	1	922	36	378	88	15	0	2	1836	93	515	242	10	0
June .....	1	917	36	290	90	8	0	2	1796	91	521	244	2	0
July .....	1	765	30	317	111	13	0	2	1643	65	375	248	5	0
August .....	1	623	25	168	72	17	0	2	1551	61	350	163	15	0
September .....	1	.....	.....	251	132	15	0	1	1557	62	330	184	0	0
October .....	1	338	13	75	56	0	0	1	1554	62	350	180	0	0
November .....	1	337	13	70	53	0	0	2	1336	53	377	175	2	12
December .....	1	351	14	50	48	10	0	1	1313	52	.....	.....	.....	.....
Totals.....	1	7228	.....	2432	800	3	0	.....	18522	.....	4562	2396	10	12

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MALAGA.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	2	1465	58	570	354	5	17	1	1355	54	.....	73	0	0
February .....	2	1699	69	426	264	11	0	1	1157	46	350	285	0	0
March .....	2	3066	122	538	351	3	0	1	1408	56	500	88	10	0
April .....	2	448	19	414	360	18	0	1	1338	53	500	90	0	0
May .....	2	443	19	477	450	8	0	1	1362	54	450	104	0	0
June .....	2	437	19	481	369	3	0	1	1431	59	460	101	10	0
July .....	2	1933	99	438	558	11	0	1	.....	.....	600	122	0	0
August .....	2	1933	99	424	504	6	0	1	.....	.....	550	116	0	0
September.....	2	2040	81	431	468	4	0	1	.....	.....	.....	.....	.....	.....
October .....	1	1632	65	403	583	14	0	1	366	14	600	159	0	0
November .....	1	1216	48	110	216	5	0	1	526	21	700	151	0	0
December .....	1	1208	48	114	173	0	0	1	1637	65	500	117	0	0
Total.....	2	17520	.....	4826	4464	13	17	1	10580	.....	5210	1406	0	0

MINES REPORT.

M

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	TANGIER AND MOOSELANDS.						WHITEBURN.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	3	697	27	42	13	3	12	2	1026	41	110	107	10	22
February.....	3	598	23	.....	.....	.....	.....	2	991	39	118	125	10	4
March.....	3	570	22	.....	.....	.....	.....	2	879	35	155	151	6	0
April.....	3	221	8	.....	.....	.....	.....	1	876	35	91	90	7	0
May.....	3	143	5	.....	.....	.....	.....	1	894	35	119	121	4	13
June.....	3	322	12	.....	.....	.....	.....	1	746	29	101	101	3	11
July.....	2	234	9	.....	.....	.....	.....	1	127	5	49	51	10	0
August.....	2	216	8	.....	.....	.....	.....	1	174	6	.....	.....	.....	.....
September.....	2	315	12	.....	.....	.....	.....	1	38	1	60	65	0	0
October.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
November.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
December.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Totals.....	3	3316	.....	42	13	3	12	1	5751	.....	803	813	12	2

MINES REPORT.

MONTHLY STATEMENT FROM GOLD FOR EACH DISTRICT. — Continued.

MONTH.	UNIACKEE.						MONTAGUE.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dts.					Oz.	Dts.
January.....	3	1260	50	203	148	12	2	133	5	82	131	8
February .....	3	1161	46	194	80	15	2	271	10	52	87	19
March .....	3	1310	52	178	88	0	2	275	10	93	145	8
April .....	3	605	24	109	333	7	2	901	36	93	136	5
May .....	3	808	32	215	187	19	2	908	36	113	181	6
June .....	3	888	35	252	188	5	2	1060	42	92	151	3
July .....	3	616	24	147	275	11	2	987	39	94	125	10
August .....	3	653	26	50	257	4	2	503	20	8	11	19
September.....	3	774	30	84	357	19	2	690	23	15	22	0
October .....	2	585	23	99	462	8	1	.....	.....	221	367	18
November .....	2	558	22	228	585	4	1	.....	.....	.....	.....	.....
December .....	2	936	39	.....	.....	.....	1	.....	.....	.....	.....	.....
Totals.....	3	10154	.....	1759	2965	5	2	5728	.....	863	1361	1
					4						0	



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WINE HARBOR.					WAVERLEY								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Gr.					Oz.	Dwts.	Gr.
January.....	1	1026	41	225	106	10	0	3	766	30	261	23	9	0
February .....	2	972	38	230	100	10	0	3	859	34	113	68	0	0
March .....	2	990	39	240	106	0	0	3	863	34	171	81	10	0
April .....	2	.....	.....	241	141	0	0	3	564	22	142	53	4	0
May .....	2	.....	.....	400	156	5	0	3	868	34	124	51	14	0
June .....	2	.....	.....		.....	.....	.....	2	1022	40	66	31	0	0
July .....	1	1031	41	253	58	0	0	1	1477	59	196	66	0	0
August .....	1	934	33	234	30	4	0	1	1106	44	61	57	10	0
September .....	1	642	25	.....	.....	.....	.....	3	905	36	132	25	5	0
October .....	1	.....	.....	.....	.....	.....	.....	3	1004	40	51	7	8	0
November .....	1	.....	.....	.....	.....	.....	.....	3	834	33	121	51	0	0
December .....	1	.....	.....	.....	.....	.....	.....	3	797	31	173	86	4	0
{Total.....	1	5595	.....	1823	698	9	0	3	11065	.....	1611	602	4	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT. — Continued.

MONTH.	SHERBROOKE.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.
January .....	5	.....	0	65	13	0	0
February .....	5	203	8	.....	.....	.....	.....
March .....	3	228	9	83	28	1	0
April .....	.....	.....	.....	36	5	10	0
May .....	3	514	20	47	16	1	0
June .....	3	.....	.....	42	7	0	0
July .....	3	451	18	35	5	8	0
August .....	3	458	18	39	16	5	0
September.....,	3	683	27	32	5	0	0
October .....	.....	.....	.....	13	2	7	0
November .....	.....	.....	.....	37	3	5	0
December .....	.....	.....	.....	35	17	8	0
Total.....	3	3527	.....	464	119	5	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	STORMONT.						UNPROCLAIMED AND OTHER DISTRICTS.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January .....	3	719	28	18	12	14	0	2	374	14	231	34	13	3
February .....	2	582	23	36	30	15	0	2	383	15	259	35	15	15
March .....	2	668	26	23	35	9	12	2	524	20	206	90	16	10
April .....	2	623	28	20	21	7	0	2	118	4	420	48	15	0
May .....	2	488	19	79	70	16	0	2	6	...	...	...	...	...
June .....	2	780	31	50	46	7	12	2	28	1	4	10	10	0
July .....	2	518	20	50	47	10	17	2	101	4	12	17	6	0
August .....	2	897	35	96	96	19	19	2	94	3	...	...	...	...
September.....	2	1243	49	129	127	4	0	2	0	...	...	...	...	...
October .....	3	1145	45	166	173	19	16	1	231	9	1	2	3	...
November .....	3	1059	42	133	229	9	0	1	210	8	16	4	6	2
December .....	3	929	37	29	64	12	0	1	375	15	250	116	15	0
Total.....	2	9651	...	829	957	3	4	2	2444	...	1399	361	0	4

## GOLD.

## GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per doz.	
	Oz.	Dwts.	Grs		Oz.	Dwt.	Gra.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,922	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	12081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22202	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
1890	24358	9	9	42749		11	9	160,164	2 73	719
1891	23391	..	..	35212		13	7	149,381	2 80	840
	530066	..	..	728403	.....			4,624,447	.....	.....

## INTERCOLONIAL RAILWAY.

*Statement showing the quantities in tons of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway during the year 1891.*

MONTH.	SPRINGHILL.		ACADIA.					DRUMMOND.		JOGGINS.		BLACK DIAMOND.		GARDNER.		INTERNATIONAL.	
	Round.	Slack.	Round.	R. of M.	Nut.	Slack.	Coke.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.
January.....	13890	206	5003	.....	35	132	.....	4460	.....	5783	.....	.....	.....	1921	.....	.....	.....
February.....	4286	77	2549	.....	.....	39	.....	3706	.....	5092	.....	.....	.....	77	.....	8	.....
March.....	5684	190	4773	16	.....	6	.....	3553	.....	2274	.....	1270	.....	.....	.....	.....	.....
April.....	9536	516	4153	.....	.....	28	.....	14	.....	1998	.....	910	.....	.....	.....	.....	.....
May.....	10982	190	1984	.....	35	89	15	1060	.....	3354	.....	796	.....	.....	.....	28	.....
June.....	12734	262	2237	.....	.....	95	15	682	.....	1570	.....	626	.....	.....	.....	110	.....
July.....	7613	850	2263	.....	.....	30	.....	565	.....	2838	.....	414	.....	.....	.....	176	.....
August.....	12654	1258	2824	.....	.....	.....	.....	257	.....	4623	.....	.....	.....	.....	.....	226	.....
September.....	7995	144	4891	.....	.....	70	.....	555	.....	1724	.....	.....	.....	.....	.....	439	.....
October.....	8876	848	4559	.....	.....	70	.....	1105	.....	2690	.....	.....	.....	90	.....	142	.....
November.....	8009	824	5279	.....	.....	112	13	2678	.....	4912	.....	.....	.....	505	.....	258	10
December.....	11131	1306	3881	.....	5	.....	.....	2142	133	1968	.....	.....	.....	.....	.....	506	20
	113390	6671	44396	16	75	671	43	20777	133	38826	.....	4016	.....	3883	.....	38	.....

## INTERCOLONIAL RAILWAY.

*Statement showing numbers of Tons of Coal received at the following Stations, from Mines in Nova Scotia, for year ending 31st December, 1891.*

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax.....	39,934	Oxford Junction ....	6
Dartmouth .....	13,586	Oxford .....	772
Bedford .....	725	Pugwash Junction ..	12
Windsor Junction....	10,487	Pugwash .....	673
Wellington .....	124	Wallace .. ...	244
Enfield .....	365	Tatamagouche .....	231
Elmsdale .....	219	Denmark .....	65
Milford .....	54	River John .....	643
Shubenacadie .....	521	Scotsburn .....	389
Stewiacke.....	700	Scotch Hill .....	13
Brookfield .....	106	Pictou .....	10,043
Truro .....	10,533	River Phillip .....	30
Valley .....	28	Athol .....	12
Riversdale .....	12	Maccan .....	24
West River .....	36	Nappan .....	52
Glengarry.....	18	Amherst .....	8,309
Hopewell .....	2,007	Aulac .....	995
Eureka .....	113	Sackville .....	3,624
Riverton .....	17	Dorchester .....	653
Stellarton .....	12,274	Memramcook .....	157
Sylvester .....	65	Painsec Junction ....	6
Pictou Landing ....	66,108	Shediac.....	240
Trenton.....	640	Point du Chene ....	18
New Glasgow .....	34,725	Moncton .....	21,407
Woodburn .....	6	Salisbury .....	1,494
West Merigomish....	6	Petitcodiac .....	545
Merigomish .....	96	Penobsquis .....	12
Avondale .....	81	Sussex .....	384
James River.....	30	Apohaqui .....	12
Antigonish .....	2,125	Norton .....	82
South River.....	12	Bloomfield .....	12
Heatherton .....	45	Passekeag .....	6
Bayfield Road .....	89	Hampton .....	378
Tracadie .....	109	Rothsay .....	148
Harbour au Bouche..	66	Cold Brook .....	6,017
Mulgrave .....	1,241	St. John .....	31,101
Belmont .....	63	Harcourt .....	24
DeBert .....	22	Kent Junction .....	329
East Mines .....	24	Chatham Junction ..	2,639
Londonderry .....	56,082	Derby Junction ....	18
Folleigh .....	6	Millerton .....	12
Wentworth .....	24	Newcastle.....	55
Greenville .....	18	Gloucester Junction..	491

INTERCOLONIAL RAILWAY—Continued.

Stations.	No. of Tons.	Stations.	No. of Tons.
Bathurst .....	64	St. Eloi .....	18
Petite Roche .....	12	St. Arsene .....	28
Jacquet River .....	12	River du Loupe .....	2,546
New Mills .....	18	St. Charles .....	14
Charlo .....	6	St. Henri Junction ..	17,828
Dalhousie .....	16	Chaudiere Junction ..	67,329
Campbellton .....	36	Levis .....	35
Metapedia .....	378	Pt. Levis .....	6,538
Amqui .....	6	G. T. Ry., (Chaudiere	
Little Metis .....	6	Junction) .....	24,275
Ste. Flavie .....	18	C. P. Ry, (St. John)..	7,663
Rimouski .....	18		
Trois Pistoles .....	69	Total .....	472,852

FORWARDED FROM	No. of Tons.
Maccan .....	10,041
Springhill .....	215,982
Stellarton .....	161,132
Westville .....	45,567
New Glasgow .....	40,130
Total .....	472,852

LONDONDERRY IRON MINES.

MEMO. OF LABOUR ETC., FOR YEAR 1891.

ORE.

	Men.	Day's Work.
Skilled workmen :—Underground .....	61	15,270
“ Above ground .....	30	8,948
Unskilled workmen :—“ .....	51	11,069
“ Underground .....	46	10,951

LIMESTONE.

Skilled workmen .....	3
Unskilled workmen .....	12

Ore Mined .....	46,350 Tons.
Coke made .....	9,281 “
Limestone Quarried .....	10,651 “
Ore received from Springville .....	113 “
“ “ Bridgeville .....	680 “
“ “ Pugwash .....	214 “
“ “ Torbrook .....	7,273 “

*Statement of Articles, the Produce of the Mine, exported from the Port of Halifax, for the Year ended Dec. 31st, 1891.*

ARTICLE.	THE PRODUCE OF CANADA.		NOT THE PRODUCE OF CANADA.		TOTAL EXPORTS.
Coal, Tons.....	31,722	\$ 97,136	2319	\$ 6,217	.....
Gypsum ".....	1,200	1,312	.....	.....	.....
Kerosene, Gals.....	585	104	5058	420	.....
Manganese.....	5	203	.....	.....	.....
Antimony.....	10	60	.....	.....	.....
Salt.....	.....	49	.....	12,694	.....
Other Articles.....	.....	.....	.....	.....	.....
Total.....	.....	\$ 98,864	.....	\$19,331	\$ 118,195
Gold.....	.....	290,650	.....	.....	290,650
Total.....	.....	\$389,514	.....	\$19,331	\$408,845

EXPORTS FROM AMHERST, YEAR 1891.

	Tons.	Value.
Coals.....	330	\$ 2,212 00
Building Stone.....	2548	12,665 00
Grindstones.....	.....	7,906 00
		<hr/>
		\$20,783 00

LIMESTONE.

Brookfield.....	Tons.....	10,651
Bras d'Or Lime Co., ".....		7,896
" " Bbls.....		39,912
Miscellaneous ".....		5,000

STONE, &c.

	Tons.	Value.
A. Seaman & Co.		
Lower Cove, Cumb. Co.—Stone.....	2,548	\$12,665 00
" " —Grindstones.....	1,960	19,600 00
Merigomish.....— ".....	180	2,000 00

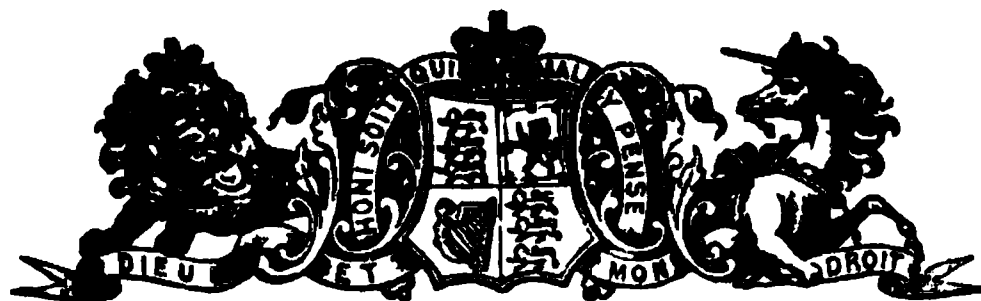






**REPORT**  
**OF THE**  
**DEPARTMENT OF MINES,**  
**NOVA SCOTIA,**  
**FOR THE YEAR 1892.**

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HALIFAX, N. S. :  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER  
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DEPARTMENT OF MINES.

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REPORT FOR THE YEAR 1892.

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*To His Honor MALACHY BOWES DALY, Esquire, Lieutenant-Governor  
of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,  
*Commissioner of Public Works and Mines*

HALIFAX, *February 15th, 1893.*





# REPORT

## ON THE

# MINES OF NOVA SCOTIA,

By EDWIN GILPIN, JR., A. M., F. G. S., LL. D.,

Fellow of the Royal Society of Canada, Member of Canadian  
Society of Civil Engineers.

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, *February 14th, 1893.*

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

*Commissioner of Public Works and Mines:*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending December 31st, 1892.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1892, compared with that of the previous year:—

		1891.	1892.
Gold.....	Ounces..	23,391	19,998
Iron Ore .....	Tons....	57,311	75,000
Manganese Ore .....	" ....	41	111
*Coal raised .....	" ....	2,044,784	1,942,780
*Coke made .....	" ....	34,148	55,000
†Gypsum .....	" ....	161,934	162,285
‡Grindstones, etc .....	" ....	19,800	11,792
†Moulding Sand .....	" ....	230	175
†Antimony Ore .....	" ....	10	—
Limestone .....	" ....	18,000	—
Copper Ore.....	" ....	900	26
Lead Ore.....	" ....	—	1

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

\* Tons of 2240 lbs.

† Amount exported.

‡ Value in dollars.

I also give as an appendix a summary of the amount of minerals produced not paying royalty.

I beg leave also to submit the reports of W. Maddin, Jr., Esq., Deputy Inspector for the County of Cumberland, and of P. Neville, Esq., Deputy Inspector for the Island of Cape Breton. These gentlemen have repeatedly visited the coal mines in their respective districts, and have as usual rendered valuable assistance to the department. Mr. Maddin, in addition, visited a number of the Gold mines during the summer and fall.

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## COAL TRADE.

---

The returns show a sale during the past year of 1,752,934 tons against 1,849,945 tons during the preceding year.

As compared with the sales of the year 1891 the most noticeable points are :—

The home sales were 623,978 tons compared with 639,737 tons in 1891.

The Province of Quebec took 746,037 tons against 775,286 tons in 1891.

The sales to the United States were 13,883 tons as compared with 25,431 tons in 1891.

The sales to Newfoundland, New Brunswick, Prince Edward Island and other points show little difference.

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## CUMBERLAND COUNTY.

The sales of the county were 422,641 tons against 462,267 tons in 1891.

The production of the collieries of the Cumberland Railway and Coal Company was 392,724 against 459,395 tons in 1891. Since the date of the last report a complete set of underground haulage has been put in, and the surface works further improved. Safety lamps alone are used underground and no explosives.

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The Chignecto mine has remained closed, and no returns of a satisfactory character have been received of the results of the prospecting carried on for other seams.

At the Joggins mines the system of long wall has been continued, and improvements made to the railway and wharf. The output was 63,505.

During the past season an American Company took over a number of coal leases, including the Joggins and other areas in the River Hebert and Macan districts, and will, it is expected, shortly develop them on a large scale.

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### PICTOU COUNTY.

The sales were 405,457 tons as compared with 405,096 tons in 1891.

The home sales were 256,545 against 265,098 tons in 1891.

The Province of Quebec took 97,334 tons compared with 63,219 tons in 1891.

The output of the Acadia Company was 250,847 tons, and of the Intercolonial Company 196,903.

The operations of the Acadia Coal Company in reopening the Ford pit were being continued with favorable prospects until near the close of the year, when fire was discovered in close proximity to the new workings. As a precautionary measure, the men and horses were withdrawn and the pits sealed. As the indications of fire increased, water was admitted from the river, and at present the work of reopening this valuable seam is suspended.

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I beg to submit herewith the report of W. Maddin, Jr., Esq., on his work as Deputy Inspector in the district under consideration.

WESTVILLE, N. S.,

1st January, 1893.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines,  
Province of Nova Scotia.*

DEAR SIR,—I have the honor to send you herewith a report on the mines in the District of Pictou, Colchester and Cumberland for the year ending the 31st December, A. D. 1892.

## SPRING HILL MINES.

*No. 1 Slope.*—This slope is now down a distance of 2609 feet by the new lift lately finished, and the levels are extended and balances driven up to the 1900 feet lift. The west levels are being advanced, and the coal between them and the "Stony" level is worked long-wall. The Lodgment at 1300 feet lift has been repaired and a dam 4 feet thick, built with lime and cement, 200 feet inside the pump, allowing them to extract the 200 feet barriers which was formerly left to prevent the waters from flowing down into the lower lift. The principal work done on the east side of the back seam has been drawing pillars; on the west side, the level has been advanced and balances driven up to the lift above. The new sinking has been opened up with travelling slope and pipe slope and levels turned away. The new left is 1000 feet deep. In the month of September work was begun to introduce the system of haulage by tail-rope in this mine. The engine house is finished and other branches of the work progressing. The following are the lengths of haul in different sections: On 1900 feet lift, west side east seam, 4000 feet; east side, same seam, 1000 feet; west side, back seam, 4400 feet; east side, back seam, 2500; and on the 2600 feet lift, west side, 1500 feet, east side 1000 feet. The pipe head has been widened to 8 feet and retimbered with iron booms, and the mine board in west side has been stripped and retimbered with heavy timber. A large amount of extra work had to be done in this mine during the past year, caused by a fault which had to be cut through both on old lift and new lift, and the turn-outs had to be lengthened (which was chiefly stone work) to render them suitable for the tail-rope system.

In the Back seam, which is worked from this mine, a body of gas was found on the 16th July, and on investigation it appeared to have been caused by a canvas inadvertently placed in the return air-way. The statement made by some parties was that the canvas had been in use at the time this airway was being driven, and that it had been rolled up and placed over a boom where the place was finished for which the use of the canvas had been required, afterward this place was converted into a permanent return airway, and through some cause the canvas fell from the boom over which it had been placed, and checked the return air. It is certain, at any rate, the canvas in this position caused the gas to gather, but whether it was put up there after the place was driven or before we failed to ascertain.

I consider canvas to be a good substitute for brattice near the face, not being so liable to damage from shots, but I think there is too much of it used to deflect air in some of our mines.

This incident, trifling in itself, shows how much care is needed in mines giving off gas, and it should be a rule in every Colliery that when the need for canvas ceases at any point, it should be removed and stored in some appointed place.

*No. 2 Slope.*—The bulk of the work done in this mine for the past season was drawing pillars, principally on the 1300 feet lift, and so far they have been won very clean. There is still a large amount of this work before the standing work will all be let down; to the rise of the Stony level it is worked longwall successfully. On account of the presence of black damp, some trouble was experienced in drawing some of these pillars, but little or no fire-damp has been met with in this mine. They began working the pillars from inside, and working back towards the bottom. In the month of June, preparations were made to introduce the tail-rope system of haulage, the engine is placed and the engine-room finished, and the other work is nearing completion. Following are the lengths of haul in the different sections:—Stony level, 4,000 feet; East side West slope seam, 4,000 feet; Jig wheel, 400 feet; New seam, 1,000 feet. The levels will be extended on the west side of the mine, both in the New seam, so called, and Stony level. The principal work in East side on this lift will be pillar working. It is not likely that the new lift will be worked to any extent for the next year.

*No. 3 Slope.*—This slope has, I think, the largest daily output of any mine in my district, there being daily drawn up from 1,000 to 1,200 boxes. The seam varies in thickness, and different systems of work is carried on to suit this. On the east side at 1300 feet lift it is worked longwall. On the west side, same lift, the levels are being extended and back balances driven up to next lift with the bords advancing, and there is sets of men coming behind drawing the pillars; in the lower lift the work is the same longwall on east side, and bord and pillar on west side. They are sinking the slope for another lift. In the month of April, preparation was made to introduce the tail-rope system of haulage and completed in the early part of October, and on the 10th of October began to work on both sides of 1300 feet lift.

The length of haul, on west side of 1300 feet lift, is 5000 feet; in east side, same lift, 2500 feet; on the 1900 feet lift, west side, 3000 feet; and on east side, same lift, 2000 feet.

This mine is not what may be termed a fiery mine. However, on the 5th of April, a balance then being driven up hill, the canvas used to deflect the air up the hill was taken down and a large body of gas accumulated, causing considerable uneasiness among the men for a time, but from that time to this gas is almost a thing of the past. The air in all those mines is what we would call good, and the work comfortable.

Nos. 1 and 2 slopes have been connected overground by a trestle-work 597 feet long, an average height 50 feet, on which are one full road and two empty ones. An engine is placed in position to run an endless chain conveying full boxes up the grade, and also an endless rope on the empty roads.

A double revolving screen 33'x42" has been erected at No. 2 slope for screening coal for both slopes. Connected with this screen are two sets of elevators and one set of conveyers, also 5 coal bins which hold from 300 to 400 tons of coal. These bins are all lined inside with iron. There will be 3 engines in use at the Springhill Mines for tail-rope haulage of the following dimensions :

Size of cylinder, 16"x20"; Drum barrel, 5 feet diameter; face, 2 feet; depth of flange, 6"; 4 drums, 2 for hauling and 2 for tail-rope; engines geared 3 to 1 of the drums; average steam pressure 70 lbs.

#### MINUDIE MINE.

Not much work has been done at this mine for the past 5 or 6 years, excepting for a few months in winter season, and then the work was done along the crop, there being a water level giving them nearly 100 feet of coal. The slope has been sunk 200 feet below this water level, and the owners have decided to work the mine, and engaged Frank Burrows as manager, and at my visit in December 19th the water was nearly out. I understand it is the intention to work this mine on the long-wall system, for which it is well adapted, as there is about 4 feet of coal with 9 inches of fire clay in the middle of the seam.

#### CROOKSHANKS MINE.

This mine is sunk some 200 feet on a seam of coal from 2 feet thick upwards, and partially worked long-wall. There are only from 15 to 20 men employed as yet. The arrangement for ventilation is very good, two air returns being driven to the surface. Mr. Burbine is Under Manager, and James Baird, Esq., is General Manager of this mine as well as the Joggins.

#### SALTSPRINGS.

Some little work has been done in this mine during the summer. About 8 men were employed, and they sank down in the seam 100 feet or more. The coal lays at an angle of from 75° to 80°. The work is stopped at present. They have erected an engine and pump, and are in a fair condition to develop the mine.

#### JOGGINS MINES.

This mine has been worked very successfully, longwall, during the past year. A new lift of 420 feet has been sunk in the longwall system. The sinking was started on the east side, about 200 feet from the slope. The landing place was 30 feet wide, and cogs or butts were carried down on one side and sets of men started on the other side and worked until the pipe head was reached. Then the cogs were made somewhat larger and the pipe head won out. Then the main slope was next worn out and so on until the lift was put down 420 feet with pipe head, main slope and travelling way. The coal has all been taken out in this lift and the entire section resting on packs.

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A place is now being driven to the surface for an airway for the east side, and a place is being repaired up through the old works for an airway for the west side, and the present airway will be for the new lift. During the year the second track has been laid in the slope. This, with the new lift, will give the management an opportunity to increase the output. 2 new boilers have been put in, a new engine house, 42'x24', and the engine moved into it. A new office has been built, 36'x32', of latest designs.

#### LAWSON MINE.

This mine was abandoned last June, very little work having been done in it for the preceding part of the year.

#### CHIGNECTO.

This mine worked for two or three months in the winter, about six men being employed, and has remained idle ever since.

*Boston Mining Co.*—Two men did a little work in it in the month of February, but it has been idle ever since.

#### MCGREGOR PIT, STELLARTON.

This mine was worked up until the 24th August, but was idle from that date to the 1st December. The new balances spoken of in last year's report have been completed, and one almost worked out. The work being done at present is principally on the south side of the mine. This pit has the largest volume of air in circulation in any one mine in my district, and is to all appearances, now safe and comfortable. The present grasp of the coal is getting somewhat circumscribed, and cannot well be enlarged unless they sink, which may not be advisable until some more pillars be taken out, a proceeding which will be attended with grave responsibility both to life and property, as this is the lowest seam worked in this basin, and the overlying seams are all more or less on fire.

#### THIRD SEAM SLOPES.

The balance on north side mentioned in last year report is still being worked and the levels extended for other balances, which is all the work being done in this seam. The south side has been worked very little this year. The Cage pit seam is being worked by way of the tunnel from third seam, and the levels extended north and south considerable distance and balances driven up. As the old works of the Cage pit are to the rise, the balances are at the first short, but now the level on south side is advanced sufficiently far to where the balances may be driven up hill several hundred feet more. This will increase output and lessen expenses. The four foot seam which is cut by the same tunnel is being worked longwall, and under this system a most magnificent percentage of coal is being won. It is a beautiful coal and a mine easily ventilated. There is a connection



from this seam into the drift leading from the Cage pit into the Ford pit. The work in those three seams has been very fortunate.

The iron ore mentioned in my last report did not prove to be of any great extent.

#### ENGLISH SLOPES, STELLARTON.

At the English Slopes they began sinking in February, and in May it was found necessary to increase the ventilation, the means previously employed being a steam jet. A small blow down fan was then erected, which gave from 7000 to 8000 feet of air per minute, and as but 2 places were sinking, this would seem to be sufficient, but during the summer months it was found necessary to stop sinking. The water for generating steam became scarce and the gas on indicator read from 1 to 3 p. c. They remained idle for 2 or 3 months. It is intended, (or was), to connect these slopes with the Foord pit. The tunnel from the Foord pit being very fiery during the summer months it became necessary to suspend operations for a while. If it had not been for those drawbacks, the connection would in all probability have been accomplished. These slopes are now down 2800 feet, their estimated distance, and the tunnel from Foord pit, is within 100 feet by estimation.

#### FOORD PIT.

The slants I have previously reported as being down a distance of 400 feet, were continued down to a distance of about 1000 feet, where a fault was struck. Several bords were turned off and some very good coal extracted. During the season there were signs of fire at the bottom of the old fan shaft. It was at once damped down and work on the south side of the mine stopped and the men put to work on the north side. Several places have been driven through into the old workings, and in one of them, in August last, at a point 300 or 400 feet to the rise, the temperature was from 95 to 98. Operations continued on fairly well until the 11th of November, when some of the men discovered very high temperature at a point 300 feet from the bottom of the shaft, about 240 feet to the rise, and on the 12th November, when I visited the mine, I considered the fire was overhead in the old workings, and the management talked over the advisability of putting boreholes through the umbrella roof to ascertain if the fire was local or if it was the old fire coming down hill. However, on the 23rd of same month, smoke was observed coming through the cribbing of the shaft, and not knowing how near the shaft the fire might be, all the men were sent up out of the mine, also the horses, boxes and tools, and at my visit on the 24th, I found the mine damped down. A few days subsequently, a consultation was held between E. Gilpin, Esq., Inspector of Mines; H. S. Pool, Esq., General Agent; Mr. Wills, Manager, and it was agreed that it would be best to let the pit stand damped down as it then was, until the water would fill in to the top of the arches at pit bottom. I visited this mine twice shortly afterwards, and the Manager informed me that gas would fire at the top of the pit. On the



7th December it exploded slightly. I saw Mr. Wills, who then told me he decided to let the water from East River run into the pit, which was done, and the water allowed to rise about 30 feet in the shaft.

#### SIX FOOT SEAM, THORBURN.

This mine worked on in its usual way until March, when Mr. Joseph Dakers resigned the management and was succeeded by Mr. J. W. Sutherland, of Westville, who began improvements by enlarging the intake airway from the 700 feet level to the 1100 feet level and retimbering it, and also retimbering it from the 1100 feet level to 1800 feet level. He also had a new overcast made at 1800 feet level to carry the air over the main level to mine bord. He then began sinking the slope, and on December 5th it was down 600 feet and still sinking at this point. However, there is quite a change in the angle of the seam, it would almost appear as if the Basin of the coal seam had been attained, as the angle of the coal seam is inclined to rise 2 or 3° instead of dipping 14° or 15°. The coal has improved in appearance to the dip. The longwall system has been stopped altogether, the management having reverted to the bord and pillar system with back balances, and are now engaged driving up a balance on the west side from the 1800 feet level to the 1100 feet level, which, when accomplished, will shorten the return airway considerably. There have been two balances driven up on the east side, making now three balances working on east side. The levels on the east side were driven up to a fault and stopped. It is very probable they will prove this fault during this winter. On the west side the coal thinned down to about 3 feet in the levels, which were then stopped. The main slope, from the 1100 feet lift, has been laid with two tracks instead of one as previous, and otherwise has been put in good shape with new timber and new sills. The mine is in very good condition and been very clear of accidents, one of which, however, was fatal. No attempt has as yet been made to open up the McBain seam.

#### INTERCOLONIAL COAL MINING COMPANY.

A very large amount of coal, during the past season, has been extracted from the large block of coal referred to in last year's report. Some of it is still there however. The pillar working has been very successful during the past year. There was another lift sunk some 400 feet, making the total length of slope now 4100 feet on the north side at the 3600 feet lift. The levels are driven to the boundary line and back balances driven up to the 3000 feet lift. On the south side the levels are in 2500 feet and are being still driven. Two back balances are driven up to the 3000 feet lift on this side. The coal appears to improve as they go to the dip. Near the crop on the north side there was a considerable area of pillars standing, a large proportion of which were successfully drawn during the summer.

## SCOTT PIT.

There were 9 or 10 sets of men working in the Scott pit, but in October it was stopped and they started sinking the slants, but only drove a few yards when they met a downthrow of 4 or 5 feet. The coal then came in regularly and of extra quality for a few more yards when another downthrow of 4 or 5 yards was encountered. This is one of the reasons why the coal was not more quickly obtained in the drift. And also when the angle was taken at 3000 feet main seam it was  $20^{\circ}$ , but as they advanced toward the second seam, the angle flattened, so that before the coal was struck it was only  $15^{\circ}$ .

On the 8th December, the coal in the tunnel was fired by a shot of roburite, and it took considerable trouble before it could be put out, as there were present some very strong feeders of gas.

## ACADIA.

During the past year this mine has been worked steadily. All the work on north side is longwall, and a large percentage of the coal has been won. On the south side it has been worked bord and pillar, and here, in mining the coal, they met with considerable trouble on account of the enormous pressure. The management have decided to try longwall in this side for the balance of the work on this lift. I have previously reported on the nature of the roof they had to contend with, and I can only add now it is no better, whatever, worse. They have sunk another lift of 350 feet, making a total depth of 3910 feet in the angle and about 1700 perpendicular height. This, with bad roof and tender coal, will give some idea of what there is to contend with. This lift was sunk 9' by  $7\frac{1}{4}'$ , and before the lift was sunk it was found necessary to lift some bottom to permit the boxes to pass up and down. After the sinking was finished they were obliged to strip the top and lift the bottom and put on wooden packs to keep it open. This lift will all be worked longwall. It is a very difficult matter to keep the return airways open, and on account of the great depth the temperature is very high. Gas is issuing as free as ever. Still, with all these draw-backs, it is, and has been, almost free from accidents of any kind.

## EAST RIVER AREA.

*John Muir and Son.*—During the year a portion of the block of coal in east side of slope was taken out, but sufficient left to support the slope. He has now resumed work on the west side of slope as usual. Some 2 or 3 men are about all that have been at work here.

## EXPLOSIVES.

Several reports have been made to me during the year, the substance of which is as follows:

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May 14th.—In No. 2 level, north side Ford pit, size 7' x 7' a shot was fired in a bench hole 3' 6" charge 10 ozs. flameless powder. John Boran shotfirer, and Angus Campbell report that they saw two distinct flames from this shot.

Nov. 1st.—Alex. Stuart, in Cage pit seam reports he saw a slight flame from roburite, and 2 or 3 other parties say they "thought they saw" light from shots before and since that date.

Dec. 7th.—A shot in the Drummond Colliery ignited some gas blowers which in time set fire to the coal, fortunately by the prompt and fearless action of many willing hands the fire was extinguished, and a serious loss to the interests of the company and country prevented.

All of the above shots were fired by electric batteries, and in mines where there is much dust I consider it safer than ordinary powder, but it is not an absolutely safe process where there is gas. I have not yet seen an explosive I consider safe to use where gas is present issuing from the strata in quantity sufficient to be detected on safety lamps. During the month of December, one A. F. Ferguson, a miner employed at the Spring Hill mines, made the following statement to me in the presence of Mr. McInnis the manager, "I was driving a steel wedge with a steel faced hammer, and a prop with fine moss in it was standing near to where I was driving the wedge, the sparks from the head of the wedge set fire to the moss and I watched it until it developed into a blaze, and I then smothered it out."

I have gathered up some of the recollections of the old miners such as Thomas Linnon of Stellarton, and John Roy, Westville, in reference to the explosions and disasters at the Albion Mines, and supposing they may be of some interest. I insert them here in a condensed form.

Fire was discovered in the old Store pit in 1834, it occurred during the night, no positive cause was assigned as the cause of the fire—subsequently in 1836 the same pits exploded and 3 men were killed, 3 or 4 more were severely burnt and 36 horses lost.

On the 5th July, 1838, in sinking No. 2 pit an explosion occurred, in which 3 men were killed and several hurt.

October, 1829, a fire damp feeder caught fire through the day, and during the night the mine exploded and from 30 to 40 horses were lost. On this occasion the mine had to be flooded with water to extinguish the fire.

The Cage pit exploded in August, 1858. Two men were killed and five or six burned.

The old Bye pit that had been sunk to the dip of the Store pits exploded during the night. Three men were in at the time and were

killed. This fire lasted from May, 1861, to January, 1862. It is supposed this fire was extinguished.

The old Bye pit caught fire from a feeder in 1867, ignited by a shot; it was then flooded and has remained closed ever since. Previous to this the Dalhousie pit and Foster pit had been sunk on the same seam to the west or north-west of the Bye pit.

March, 1869, the Ford pit having been sunk to the dip of the old Bye-pit, caught fire and was flooded.

In 1870 the Foster pit caught fire, and at this time the store pits, old Bye-pit, Dalhousie pit and Foster pit were connected.

The Foord pit was put through into the Dalhousie slants in September, 1880, and the water from the old slants came down into the Foord pit.

On October 12, 1880, a section of the working of the Foord pit was put through into the south side of the old Bye-pit, and 6 men were killed by the water coming in.

On November 12, 1880, the Foord pit exploded and 44 men were killed and some more injured fatally. The pit caught fire and was flooded and remained in that state for some time.

In the year 1889 the water was taken out of Foord pit and the pit was again placed in working order, but unfortunately, in November 11th, 1892, there were indications of fire 300 feet north of pit bottom, and on the 23rd day of same month, further indications of fire were seen at the bottom of the shaft. All the men, horses and tools were taken up and the water allowed to rise in her. On December 7th, it exploded slightly at pump shaft, and on the 8th, at the hoisting shaft. The water was then let in from the East River. On the 10th December, another slight explosion occurred. On the 12th the water was stopped from running in. This pit is still in this condition.

#### CAGE PIT.

This pit was sunk in 1852, and matters went on smoothly until 1855, when the explosion above referred to occurred. It was not restored to working order until the year 1864, when another explosion above mentioned took place. In the year 1870, the pillars were taken out of a section on west side, under the Foster pit workings, and in 1873, fire was discovered in this section of the Cage pit supposed to have come down from the Foster pit. The fire was walled off. In the year 1877, 2 drifts were driven from the Cage pit into the Ford pit, and on November 12, 1880, when the Ford pit exploded, the cage pit was also closed, as the fire came through into it by way of the connections with the Ford pit. It was then damped down and still remains so.

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**THIRD SEAM.**

In 1881, the third seam was opened. In 1887, there were signs of fire coming down through the broken from the Cage pit workings, which overlaid the third seam, and on a Sunday in January, 1888, an explosion occurred in it, caused by the fire from the broken. Fortunately no one was killed, but the loss to property was heavy. In 1889, this seam was opened up again and is now working, excepting the west side to the rise where the fire was which is built off.

**FOSTER PIT.**

The Foster pit was sunk in 1866 and worked until 1870, when it was discovered on fire, for which no particular cause could be given. It was damped down and remains closed ever since.

**DALHOUSIE PIT.**

The Dalhousie pit was sunk in 1850 and worked with favorable results until 1864, when a very large portion was lost by a creep to the dip. It was, however, worked to the rise up to 1870, when being connected with the Foster pit, then on fire, it was closed and remains so yet.

I have the honor to remain,

Your very obedient servant,

WILLIAM MADDIN, JR.,  
*Deputy Inspector of Mines.*

## ACCIDENTS IN YEAR 1892.

No.	Date.	Mine.	Person.	Occupation.	REMARKS.
1	Jan. 12.	Albion Mines.	James Stanton.	Locomotive driver.	Fatally hurt; train of hoppers ran over him.
2	Feb. 3.	McGregor Pit.	William Larkins.	Miner.	Hurt by a fall of coal from working face.
3	Mar. 26.	No. 3 Springhill.	Angus Carrigan.	Miner.	Hurt while at work, by a falling prop.
4	Apr. 4.	" "	Jos. McPherson.	Miner.	Hurt by a fall of coal from working face.
5	July 22.	Acadia Mines.	Richard Skully.	Shiftman.	Arm smashed by timber car; amputation necessary.
6	" 25.	No. 2 Springhill.	John W. Brown.	Loader.	Hurt by a piece of stone falling from roof. [boom.]
7	" "	" "	David McSweeney.	Shiftman.	Cut the top off his thumb while engaged cutting a
8	" "	" "	James Shepley.	Surface laborer.	Accidentally fell into an empty car, broke his arm.
9	" 27.	No. 1 "	Samuel Hatfield.	Driver.	Hurt; boxes ran over him at slope bottom.
10	" "	No. 3 "	Paul H. Good.	Shover-on at bal- ance.	Arm caught and broken, lifting on a box.
11	Aug. 26.	" "	Richard Durham.	Miner.	Hurt by a fall of coal from working face.
12	" 27.	No. 2 "	John Quinn.	Loader.	Foot hurt in a chute while putting coal down.
13	" "	" "	William Wilson.	Loader.	Hurt by a fall of coal from working face.
14	" "	" "	William Miller.	Shiftman.	Hurt by two rakes meeting.
15	" 28.	Joggins Mines.	Joseph Jefferson.	Miner.	Leg broken, fall of top coal from working face.
16	" "	" "	Alex. Miller.	Miner.	Leg broken, fall of coal from working face.
17	Sept. 3.	Springhill "	Murdock McGill- ivray.	Surface driver.	Leg broken, trying to get into a car in motion.
18	" "	Drummond Mines.	James Oliver.	Screenman.	Fell and seriously hurt while trimming a car.
19	" 1.	Vale Colliery.	Berry Boquet.	Miner.	Killed; fall of coal from working face.
20	Aug. 31.	Drummond.	David Roy.	Boy on sheets at slope bottom.	Leg broken, box ran over him.
21	Sept. 8.	Joggins Mines.	Amos Brown.	Miner.	Killed by a runaway rake in slope.
22	" 10.	Drummond Mines.	Niel Johnston.	Screenman.	Killed by a coal hopper running over him.

23	"	20.	No. 1 Springhill.	Fred. Burk.	Driver.	Head badly hurt between boxes.
24	"	26.	Drummond.	Wm. Johnston.	Miner.	Hurt getting on riding car while in motion.
25	Oct.	3.	No. 1 Springhill.	Geo. Hopkins.	Miner.	Killed by fall of coal from working face.
26	"	6.	Drummond Colliery.	Charles Dunlap.	Driver.	Thumb smashed, full rake passing over it.
27	"	7.	"	Howard Marshall.	Screen boy.	Squeezed by car while letting it down. [rake.
28	"	12.	"	Joseph McKenzie.	Miner.	Hurt by being caught between the full and empty
29	"	"	No. 3 Springhill.	Dan. Carmichael.	Switchboy.	Arm broken, fall of coal from face.
30	"	13.	Drummond.	Wm. Bryson.	Boy with the Sulphur-man.	Thumb smashed; amputation necessary.
31	"	18.	No. 1 Springhill.	Richard Costigan.	Shiftman.	Killed in lowering timber down slope, one came down and struck him. At inquest the jury recommended that in future dog hooks be used in lowering timber.
33	Nov.	1.	No. 2 Springhill.	Joseph McNiel.	Miner.	Caught by cage in balance and badly hurt.
33	"	26.	Drummond.	Gilbert Darroch.	Cage runner.	Hurt by balance box striking him.
34	"	"	No. 1 Springhill.		Leader.	Leg broken stepping before balance box, accidentally.
35	"	"	No. 3 "	Donald Cameron.	Shover-on at bottom.	Severely hurt; caught between rakes.
36	Dec.	7.	Drummond.	John Roy.	Miner.	Slightly burnt by gas in tunnel.
37	"	"	"	John Hayman.	Miner.	Slightly burnt by gas in tunnel. [fall from roof.
38	"	28.	3rd Seam, No. 2 Slope.	John Smith.	Miner.	Ankle dislocated and a small bone fractured by a

Amount of Timber and quantity of Explosives used at each Colliery during year, 1892.

MINE.	PROPS.			BOOM.			EXPLOSIVES.					
	No. of Pieces.	Length.	Lineal feet.	No. of Pieces.	Length.	Lineal feet.	Powder Lbs.	Flameless Powder Lbs.	Roburite Lbs.	Dynamite Lbs.	Fuse, feet.	
Acadia.....	.....	.....	.....	.....	{	410,000	.....	.....	.....	.....	.....	
Albion.....	.....	.....	.....	.....		160,000	850	2,700	.....	.....	.....	.....
Vale.....	.....	.....	.....	.....		154,291	23788	.....	.....	.....	.....	.....
Spring Hill .....	41,853	12	591,936	.....	14	.....	.....	.....	.....	.....	.....	
	46,119	10	46,490	42,259	10	507,108	.....	.....	.....	.....	.....	
	61,312	4	245,248	.....	12	.....	100	.....	.....	250	.....	
	728	6	4,272	.....	.....	.....	.....	.....	.....	.....	.....	
Joggins.....	42,495	8	339,960	.....	.....	.....	.....	.....	.....	.....	.....	
	904	10	9,040	.....	.....	.....	.....	.....	.....	.....	.....	
	18	15	270	.....	.....	.....	.....	.....	.....	.....	.....	
Drummond Colliery .....	.....	.....	369,273	2,889	14	40,446	.....	6,937	29'	.....	.....	



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## CAPE BRETON COUNTY.

The total sales for this County were 923,869 tons, against 982,392 tons in 1891.

The production and sales of the Collieries for the year 1893, were :—

Colliers.	Raised Tons.	Sold Tons.
Bridgeport .....	32,230	31,328
Caledonia .....	120,230	107,200
Gardner .....	41,636	39,485
Glace Bay .....	154,845	138,413
International .....	111,856	105,479
Ontario .....	28	28
Reserve .....	154,790	135,836
Sydney .....	189,994	164,078
Victoria .....	121,638	108,332

Some prospecting work was done at various points, but no details have been received by the department.

I submit Mr. Neville's report, as Deputy Inspector, on the Coal Mines of the island of Cape Breton, for the year 1892.

BRIDGEPORT, December 31st, 1892.

E. GILPIN, JR., ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR:—I beg leave to forward you a report of my work, through the different Coal Mines in Cape Breton, during the year 1892.

## SYDNEY MINES.

Extensive repairs have been made at this colliery during the year. In the main pumping shaft, 300 feet of cast iron tubing have been put in place; in the cage slides, pump and pump frames have been renewed and 400 feet of pump rod put in place.

The pulley frame of the main hoisting shaft has been strengthened, by placing in position with the present frame string pieces of pitch pine timber. A speaking tube has been placed in the main shaft.

The Queen pit upcast has been repaired from top to botton, the old wood taken out and new wood put in. In the pit, the north side workings have been concentrated towards the dip, and all the coal hauled up the pump deep, from the lowest landing, which is 1760 yards from the shaft, or 1500 yards below the bank head.

A slant road has been driven to the old Skinner's Section, by which the coal from there and old No. 2, will be run down self acting.

Below old No. 3, the submerged district, a branch has been started and working since last June; 200 yards below there a fine section of coal is won, and now in good working order with a very fine landing there. Also a double road is being laid from the bank head, 1000 yards down this deep; in order to facilitate the haulage of the coal from the increased depth, a pair of 15 inch cylinders, a pair of 26 inch cylinder engines, are being built to supersede those now in use.

On the south side of the pit the main deeps have been extended 300 yards below the large trouble, and a new landing made there which is now in operation; this will be the finest section in the pit, nearest the shaft total distance being 1140 yards.

Mr. John Greener has sunk a small shaft on his area through what is called the No. 3 seam, and has had a few men getting coal out of it during last winter, which was sold I presume for local purposes. I understand that work is resumed again there this winter.

#### VICTORIA MINES.

Work has been very actively prosecuted at this mine during the present year. The west main slant has been extended and another lift of 600 feet gained, and a pair of both east and west levels are in course of being driven.

The west levels are in about 350 feet, but no balance commenced yet.

The management thought to abandon the 1,200 feet lift going west where they were taking out the pillars owing to the subsidence of the overlying strata interfering with their railroad.

The east level in the 1,200 foot lift in the east slope is now about 4,200 feet in from the engine landing. One balance having been driven during the year, and 20 rooms won out; and another balance commenced near the face of the levels, which will in all probability be the last one in this section, as the cover thins out in this direction and would most likely admit water into the mine if continued much further.

The east levels in the 1,800 feet, lift in the same slope are in some 3000 feet and rising at an angle of  $5^{\circ}$ , this is driven so as the tube will self act (or incline,) and thus do away with horses.

Three balances are at present working in this district. I am informed by the management that it is their intention to bring all the coal out on the centre slope in the near future, for which preparations are being made, and three separate roads are being driven, one being intended for the haulage road with two tracks of rails, so that the engine will be assisted when bringing a full trip up the slope by the empty trip going down at the same time.

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On the east side of the centre slope a separate road has been driven for the steam and water pipe from the pumps, and on the west side of the centre slope a road is made, to be used as a separate way for the workmen travelling to and from their work.

I might state that stooping has been successfully carried on during the shipping season and hardly any coal lost.

The eight feet dia. "Murphy Fan," mentioned in my last report has been erected and is doing its work satisfactorily.

The Heapstead is being all covered in order to keep the banksmen dry during wet or stormy weather, and also keep the rain and snow from drifting into the mouths of the slopes during the winter season.

#### LINGAN MINES.

Two or three men have been working in this pit part of the summer, and raised about 160 tons of coal, which has been shipped to Sydney mines.

#### GARDNER MINES.

Work has been going on steady during the past year. Mining coal has been chiefly confined to the south side of the pit.

The levels have been extended 400 feet and the headways about 300 feet. At the time of my last report the one level was used for haulage, drainage and return airway. Since, a lower level has been driven, and used for drainage and return airway, making a remarkable improvement. The water lodgement has been considerably enlarged.

An incline road has been laid from the pit bottom to about 600 feet towards the rise where a breast of about 250 feet has been opened out and worked successfully by the Jeffrey electric coal cutting machine. A second incline is in course of construction which will be 1000 feet in length, striking the face of the workings on the south side at a point about 600 feet to the rise of the level and will take the coal direct to the pit bottom, relieving haulage by horse and largely increasing facilities for getting coal.

On the surface many improvements are visible. A smoke-stack 60 feet long by 3 feet dia. made out of  $\frac{3}{4}$  inch iron has replaced the two smaller ones previously used. A tubular boiler 14 feet long by 4 feet with 6 inches dia. flues has been put in service. An engine of 10 horse power has been fitted and used for hauling coal from bank. A hot well has been sunk, from which boilers are being supplied.

The old dwelling houses which were in a dilapidated condition have been all thoroughly repaired and tenanted by miners and their families.

#### OLD BRIDGEPORT.

Mining has been confined to the south and rise of the south levels during the season. The incline road has been extended further to the rise and a new section of rooms opened out there.

## INTERNATIONAL.

There have been no new feature of work in this mine during the year. No. 9, south levels have been extended 7 chains, ventilation was good, and rooms and roadways well timbered. On the bank a slack bunk was built, 100 feet long by 28 feet wide, capable of holding 700 tons, from which the slack coal can be run into the wagons with very little shoveling.

The bank frame and part of the heapstead have also been raised.

## LITTLE GLACE BAY.

During last winter a pair of deeps were started on the south side of the pit, and driven to the dip 866 feet, and levels broken off north and south and driven about 600 feet each.

Rooms have also been opened up there, at the time of driving those deeps and levels it was found very difficult to keep up the roof, it would come down without giving any warning, a thickness of six feet in places and cutting along the pillar, and breaking close to the face. However, after the rooms were opened out, the pressure on the narrow places was relieved and the trouble ceased.

An engine with a pair of cylinders  $12 \times 24$  inches, is placed to the rise of the pit on the south side, by which the coal is hauled from the deeps, and then run back to the pit bottom.

On the 1800 foot headway where the coal used to be hauled by horses, it is now run by an incline road self acting.

A new hoisting engine has been put in place of the old one, with a pair of cylinders  $18 \times 24$  inches, and drum 7 foot diameter, which gives good satisfaction.

## CALEDONIA.

Work has been going on in about the usual way. A section of pillars have been split on the high side of the east level. The new east deep has been driven 300 feet, No. 4 east levels extended about 280 feet, all the coal mined here this season was chiefly taken from the deep with the exception of the above mentioned pillar.

An Ingersoll Air Compressor, has been added to the plant size  $20 \times 30$  inch cylinder, driving three coal cutting machines, on in the east deep distance from engine 1,410 feet, two inches, the west deep 2,900 feet, they are giving good satisfaction.

In addition to the improvements on bunk, a new smoke stack has been erected, size 66 feet long, 3 feet  $1\frac{1}{2}$  inch diameter, steel plate. A new engine house has been built, walls and floor concrete; also the boiler house and foundation has been rebuilt.

A Forge  $100 \times 28$  feet has been built.

## GOWRIE MINES.

The east side bank head heading was lengthened to give more room for a longer trip, 9 boxes put on now instead of 6 as formerly. The east side has been driven 360 yards, at 250 yards below No. 2 east side levels. Three levels have been turned off south, and driven 150 yards, and rooms opened out there, and a fine landing made.

The old levels above this on the east and west, have been extended as usual. A section is being opened up on the west side of the east deeps, north of the stone trouble, also on the west side of the pit.

The section mentioned in my last report, north of the stone trouble, is still being worked, and about the same width of coal between that and the anticlinal.

On surface, an Ingersoll Air Compressor has been added to the plant, size 16 steam and 20 inch air cylinder. A new pump, 12x12 steam cylinder and 5½ inch water end were placed in the new deeps. All the pumps are now driven by compressed air.

The coal on the new lease was successfully prospected to the north west of the down-throw fault with a Bullock Diamond Drill, and the seam 6 feet thick, proved and traced to the north west boundary.

## CARABOU COAL.

I did not notice much improvement at this mine since I visited it last season. It was at a stand still when I was there on the 1st of September last. There were only three men at work around the mine, two of them I presume attending the engine and pump keeping the water out of the pit.

A new Dean pump has been placed in the pit, 10 inch cylinder 7 inch, and 5 inch plunger 18 inch stroke, double acting, capacity 1½ gallons per stroke.

The shaft was sunk about 30 feet deeper and cage slides and buntings put in. A very good bank and pulley frame has also been erected.

I notice a great number of wharf logs and timber, at the shore for the purpose of being put into the building of a wharf. I was told by the manager there, Mr. Wilson, that the site was not yet settled, and was in dispute, owing to the parties who owned the water lots, and this was the cause of the mines being idle, but he hoped that the wharf would shortly be built and work resumed.

## RESERVE MINES.

The heapstead has been covered and boarded in down to the slope mouth. The east deeps 300 feet, the south low levels extended about



200 feet. No work has been done in the west main slope since last report.

A new pump has been placed in the drift, size 30 inches, stroke 9 inches, water 14 inches, steam cylinder. I am informed by the manager that the east drifts are to be driven to the boundary line, in this way a large area of coal can be won towards the south end of the Reserve lease, as the crop of the coal extends south of the southern boundary line.

#### EMERY MINES.

Extensive improvements have been made at this mine during the year. An Ingersoll air compressor cylinder 20 x 30 inch, 2 boilers and 8 coal cutting machines, 1 new pump which pumps from the deeps, and an engine which hauls the coal from the deep workings, are added to the plant. Also, a boiler and engine house have been built. The engine is placed in the pit to the rise of the shaft bottom, and hauls the coal up the deep, and it is there let back to the pit bottom.

All the levels and deeps are driven by the machines except the two high west levels; the greatest distance that any of the machines are from the surface is 1,540 feet. Those coal cutting machines have given great satisfaction. The deeps have been driven 250 feet, the upper north levels 640 feet and the low deep about 700 feet.

Prospecting has been going on pretty extensively during the last season in Cow Bay Basin, by Mr. Archibald and Mr. Landrie. Mr. Archibald succeeded in tracing the Gowrie, or an underlaying seam 6 feet thick out to Morrison's lakes. I did not hear if Mr. Landrie struck the Tracy seam or not, but it is doubtful, as no reports of a workable seam has been made. Also, west of this considerable prospecting has been done on Mr. Murray's area, but it appears that the seams of coal there opened are small.

It is reported within the last few days that a seam on the Louisburg Railroad, west of the Lorway seam, on Mr. Mossely's area has been opened. It is said to be 4 feet 11½ inches thick, also it is opened west of the Gardner Mines, western boundary line; it is said to be 5 feet thick there. I have no doubt but this is the equivalent of the seam that Mr. McVey showed me a year ago west of the Lorway, on the southern line of the McColl area. At this point the seam was found to be 4 feet, 6 inches at the crop. Also prospecting has been prosecuted west of the Lingan Low Point Basin, by the Messrs. Routleges, with a diamond drill, driven by steam, but I have not learned that they struck any seam worth notice.

I have the honor to be

Your most humble servant,

P. NEVILLE,  
*Deputy Inspector of Mines.*



## REPORT OF ACCIDENTS IN CAPE BRETON COLLIERIES, YEAR 1892.

DATE.	MINE.	PERSON.	OCCUPATION.	AGE.	REMARKS.
Feb'y 17 ..	Gowrie .....	Murd. McPherson.	Miner .....	35	Leg broke, fall of roof stone in face of level.
May 26 ...	Sydney .....	Jas. Gleason.....	Shift-man ..	24	Killed by falling down shaft while working there.
" 28 ...	International	Dan. McAdam ..	Laborer ....	50	Ankle bone broke, piece of stone from roof.
June 2 ...	Gowrie .....	Dan. McDonald ..	Miner .....	40	Hurt on back and head, caught by cage.
" 13 ...	Sydney .....	Jas. Edwards ...	Shot-firer ..	46	Slightly burned by gas on face and hands.
Aug. 25 ...	Reserve .....	John McDonald ..	Miner .....	46	Killed by fall of loose coal from face of room.
Sept. 7 ...	Victoria .....	Arthur Cantfill ..	Bottomer ....	16	Crushed by runaway box down balance. Died on 9th.
Oct. 10 ...	Emery .....	Alex. McDonald ..	Miner .....	28	Injured about the abdomen, piece of coal at face.
Dec. 24 ...	Victoria .....	George Long .....	Fireman ....	32	Killed by boiler explosion.
" ...	" .....	Dan. McDonald ..	" .....	38	Scalded by boiler explosion. Died same evening.
" ...	" .....	Cyril McAdam ..	" .....	28	" " " Died 9 days after.
" ...	" .....	John McSween ..	St. Mason....	..	Leg broke by flying brick from explosion.
" ...	" .....	John McPherson ..	" .....	..	" " " "
" ...	" .....	Murd. McIntyre ..	Miner .....	..	Head cut " " "

Table showing Circulation of Air in Cape Breton Pits, 1982.

NAME OF MINE.	Ja.ny.	Feb'y.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sydney Mines.....	60,840	80,080	72,120	70,625	66,850	71,840	71,435	58,520	63,140	68,200	70,605	68,950
Victoria " .....	48,020	48,920	47,220	44,480	47,800	55,680	49,600	79,300	62,896	52,642	72,900	56,620
Old Bridgeport Mine .....	.....	15,000	17,000	20,900	28,120	26,400	25,540	23,300	30,000	24,520	18,500	19,450
Gardner " .....	15,026	17,210	21,200	19,812	17,320	31,000	19,800	20,000	20,000	15,000	20,360	17,080
Reserve " .....	.....	40,250	35,766	40,000	43,982	41,000	32,940	47,530	38,960	40,800	33,110	44,000
Emery " .....	18,120	17,500	23,800	28,870	31,106	25,110	24,600	24,000	24,910	25,230	15,500	19,980
International " .....	.....	18,000	.....	40,300	56,000	63,500	63,240	85,300	89,500	77,980	92,650	50,000
Little Glace Bay " .....	30,000	24,530	25,000	32,000	14,590	24,510	25,650	42,600	30,600	40,000	35,000	38,000
Caledonia " .....	48,275	45,210	51,650	49,960	55,500	38,140	41,840	42,220	56,400	50,830	51,000	40,000
Gowrie " .....	32,560	30,760	34,650	27,300	51,210	40,000	38,940	41,920	37,200	38,600	31,130	39,440
Lingan Pit.....	.....	.....	.....	.....	.....	.....	.....	2,000	.....	.....	.....	.....
Caribou " .....	.....	.....	.....	.....	.....	.....	.....	.....	1,000	.....	.....	.....

NUMBER AND DATE OF VISITS DURING THE YEAR 1892.

NAME OF MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sydney Mines .....	23	19	1	21	26	4	7	5	2	25	18	17
" .....	.....	.....	.....	27	27	15	.....	.....	.....	.....	.....	.....
Greener's Pit.....	.....	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Victoria Mine .....	29	15	18	22	.....	3	15	18	12	31	12	13
" .....	.....	.....	.....	.....	.....	.....	.....	.....	26	.....	19	24
" .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28
Lingan Pit .....	.....	.....	.....	.....	.....	.....	.....	8	.....	.....	.....	.....
Gardner Mines .....	26	17	23	19	19	27	28	11	5	28	16	5
Bridgeport " .....	.....	22	.....	13	20	17	4	9	6	29	7	8
Reserve " .....	.....	16	9	16	9	13	20	25	15	11	14	13
" .....	.....	23	.....	.....	.....	.....	.....	29	22	.....	.....	.....
Emery " .....	25	8	22	4	7	16	23	10	17	12	5	10
International .....	.....	22	.....	7	11	30	12	17	19	28	9	6
Little Glace Bay .....	21	11	21	11.	5	16	26	2	20	7	7	2
" .....	.....	.....	.....	.....	24	.....	.....	.....	.....	14	17	6
" .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27	.....	.....
Caledonia Mines .....	27	9	12	6	6	11	30	12	7	23	11	12
Gowrie .....	28	20	10	9	14	6	11	16	18	10	4	14
" .....	.....	.....	.....	.....	.....	18	13	.....	.....	13	.....	.....
" .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	.....	.....
Caribou Cove Pit .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....

## GOLD.

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The returns for the year 1892 show that 32,552 tons of quartz were crushed, yielding 19,998 ounces of gold for 120,761 days' labor, as compared with 35,212 tons of quartz yielding 23,301 ounces of gold for 149,381 days' labor. It is to be regretted that small as our annual returns are, there is again a decrease as compared with the year 1891.

### SURVEYS—GOLD.

Surveys were made by Mr. Sam Smith in Queens County, and by Mr. Wentzell in Lunenburg County. Mr. Anderson and Mr. Christie were employed in making surveys in Halifax County, and the former made reports in connection with grants to roads to gold mines at South Uniacke, Carribou and Montague. The expenditures on these roads will, it is expected, be made during the coming summer.

The proposed re-survey of the Johnston Brook District, Country Harbor, was not carried out, the lessees not being unanimous in seconding the offer of the Department. Part of the Wine Harbor district has been re-surveyed and laid out in regular blocks.

The following general statement shows the yield of each district:—

# MINES REPORT.

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## GOLD—GENERAL STATEMENT FOR YEAR 1892.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.		Total Yield of Gold.	
					Oz.	Dwts. Grs.	Oz.	Dwts. Grs.
Tangier } Mooseland }		3172	2	311	6	15	103	8
Oldham		17032	2	2259	1	9	3093	13
Caribou } Moose River }		14309	4	7189	6	11	2335	16
Stormont		18094	1	3625	13	18	2482	11
Salmon River		11702	1	4220	4	22	1042	10
Sherbrooke		4470	2	893	4	..	179	8
Montagu		6640	1	1716	1	15	2201	10
Malaga		7772	2	2720	19	12	2656	5
Waverly		9057	1	3154	5	17	906	11
Uniacke		12006	2	786	18	12	2300	..
Lake Catcha		5284	2	2467	8	11	1046	18
Fifteen Mile Stream		7825	1	2412	12	13	1236	17
Unproclaimed and other Districts.		3398	3	800	10	7	412	13
Total		120761	24	32552	..	..	19998	3 18

Since completion of table, additional returns from Waverly show 1051 tons of Quartz crushed, and 332 oz. of Gold for November and December, and returns from Truro Mill, Caribou, show 30 tons yielded 750 oz. for the month of December.

I append the following report of Deputy Inspector Maddin on his visits to some of the gold districts during the past year :—

WESTVILLE, PICTOU Co., N. S.,  
January 2, 1893.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines,  
Province of Nova Scotia.*

DEAR SIR,—I have the honor to present you with a short report on the various gold mines visited by me during the year just closed.

### GOLD MINES.

*Crow's Nest Mine.*—At date of my visit 30th August, this mine was idle, the manager Mr. Duncan Rankin, was on the ground and courteously showed me over the work. He has opened up some new leads which look very well. His ideas which appear perfectly plain and practicable, would I think if acted upon and carried out, be efficient and considerable saving to the company.

*Cochran Hill Mine.*—I was at the mine on the 30th August, and found three men prospecting, and had opened up a new lead which showed gold. I cannot but say right here that I feel grieved to see those mines standing idle, as they are fairly well equipped with machinery and buildings, and leads opened up showing gold.

*Country Harbor Gold Mines.*—31st August. The Copeland mine is down 100 feet. They have a fifteen stamp mill and employ thirty men. This is a new mine and looks very well. Manager, J. C. MacDonald; Underground Manager, J. C. Mason.

*Johnston Mine.*—Manager, R. McNaughton. It was idle at time of visit.

*Isaac's Harbor.*—No. 9, South Mulgrave, has not been worked since my last report.

*The Modoc Lind.*—Wm. Hughes and others worked this mine up to the 25th August. It is now idle.

*The North Star Co.*—Manager, Robert McLeod; Underground Manager, W. Walsh. Were down, at date of visit, 400 feet, on an angle of from 20° to 30° south. There is also a westerly dip, caused by a roll in the measures. Thirty men are employed. A new mill is nearly completed with ten stamps, also a new engine and boiler. The engine is of sufficient strength to run the mill and two or three new hoists. This mine is in good working order. There is another new mine in this district called the Richardson mine. Manager, C. F. Anderson; Underground Manager, C. Silver. Thirty-one men employed. They are erecting buildings and sinking on the various leads and intend erecting a twenty stamp mill.

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*Wine Harbor.*—September 1st. E. Conroy, Underground Manager, has sixteen men under him opening up the old plan lead. The Manager, H. Harding, was absent at the time of my visit.

*Goldenville.*—September 2nd. There is a new property being opened up here called the "Alexander." About ten men employed at the time of my visit.

John Williams is opening up the old Wellington mine. He had six men employed, and was engaged taking out the water by means of a syphon.

*Ecum Secum Mine.*—September 3rd, Mathew McGrath, Manager; thirteen men employed, they are working on the south dip, they have an eight stamp mill. Since Mr. McGrath took charge this mine is paying.

I went in that district to Moose Head, to see a mine which has been idle for the past three or four years; there is a twelve stamp mill, and engine and boiler, all looking fairly well.

At Hurricane Cove, there is an eight stamp mill, with engine and boiler, this property looks very well. I was informed that one R. McMann was going to start work here in a very short time. The last two mentioned mines are parallel cases almost to the Crowe's Nest Mine and Cochran Hill Mine, referred to before, and I cannot but say here, it looks very odd to see mining properties well equipped with all necessary plant and very little work done, property not half prospected, and the plant and buildings left to rust and decay.

*Dufferin Mine.*—Salmon River, September 5th, Manager H. Archibald, Underground Manager, R. S. Irving. This mine is working in the second east shaft which is now down to a depth of 200 feet; the other is down 300 feet; they are cross-cutting north. They have a 16-foot belt showing gold, also an 8-inch lead, which in test yielded one ounce to the ton. There are forty men employed. All the milling is done by water power, also the hoisting. They have a twenty stamp mill, which is capable of crushing sixty tons in 24 hours. This is a fine mine in every respect.

*Tangier.*—September 6. Mining operations have in this place been virtually at a stand-still for some years past, but John Murphy never lost faith in it, and his patience and efforts have at last been rewarded by striking what some think to be a good paying lead.

*Oxford Gold Mining Company, Chezzetcook.*—Manager J. M. Reade, Underground Manager, D. M. Thompson. As stated in last year's report, this mine is worked economically; compressed air being used for pumping, drilling, hoisting, etc., etc. They have a ten stamp mill, and 22 men are employed. A large quantity of surface has been milled, and payed very well; but advantage was taken during the dry season to prospect, and some leads were opened up further west;

these leads are giving them all the crushing they want, and the surface remains for slack time. This mine is doing very well; they are now working in what is called the Randolph lead and the Barker lead.

In the same district John H. Anderson, employed twelve men working in the Lake lead and the Baker lead, and one Wm. Carl, has three men employed working on the Cogswell or Angler lead.

This appears to be a very fine looking mining district, and both men and management appear satisfied, a pretty safe indication that prosperity attends their work.

I might say that the mines I visited were in good order for the workmen, and for ventilation, and for timbering, and loaders are much better pleased, and I think I am safe in saying that gold mining is somewhat ahead of last year. The roads are 50 per cent. better around the mines than they were last year, which will undoubtedly prove a help to both miners and prospectors.

*Mooseland District.*—October 3rd. Visited Gay's River, and found William Todd, with seven men prospecting, and Frank Burnos, with six men prospecting, and Thomas Bogo, with six or eight men taking water out of an old shaft, for some Truro Co.

October 4th. Visited Moose River Gold Mines, M. D. Touquay, Manager, and Thomas, underground manager. Twenty men are employed on the little North lead, and the Copper lead; this mine is in good condition and they appear to be getting a fair share of gold, they have been and are crushing a large amount of surface which pays well.

William Bruce, has eight men at work in the Archibald property, and is doing fairly well. This district is much the same as last year, but the roads are much better.

October 5. Visited Mooseland and found G. Stemshaw, Manager, and E. Magrath, Underground Manager. 18 men employed; 8 stamp mill. A very large amount of prospecting has been done on this property previous to sinking the present shaft, and they are now receiving a reward for their labor and perseverance. The present shaft is sunk in a basin, and the river runs only 120 feet away from the shaft. It is, however, the driest shaft I have yet seen in our gold mines. A large water tank was placed about 20 feet down the shaft, and all the water from surface is caught in, thus leaving the mine where the miners are working comparatively dry, which I consider to be a great saving to machinery, beside the comfort to the men, and the men can do more work than if the water was allowed to go down into the mine.

There are two men, Gladwin and Hare, working in the Musgrave property, and have 6 men employed. The work is in good order.



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*Caribou Gold Mines.*—October 6. I visited this district. Manager, H. Dickson; Underground Manager, Patrick Coffie. 20 men are employed working on the old Fisher lead. This mine is in a very good condition and appears to be doing very well. There is no change worthy of notice since my last return, but it is very probable Mr. Dickson will do some prospecting shortly.

George Stewart is beginning to develop the lake lead again and is showing some very fine metal. He has 7 or 8 men employed and intends to gradually increase his force.

R. Wright is prospecting north of the lake lead and has 4 men employed. Gold mining appears to be more vigorously and actively prosecuted this year than last. There are also several groups of men prospecting around. The roads being largely improved during the past 2 years gives men an opportunity to move around and prospect the country.

I have the honor to remain  
Your very obedient servant,

WILLIAM MADDIN, JR.,  
*Deputy Inspector of Mines.*

*Oldham District.*—The Standard Gold Co., working the Dunbrack Lode, have attained a depth of 490 feet. The mine is well equipped with steam winding and pumping engines, and an Air Compressor. The Oldham Gold Co., have been running prospecting drifts on the Baker Vein, at a depth of 360 feet, and have also done considerable stoping work on the Dunbrack Lode. The new mill of this company does all the crushing for the district, and has run steadily during the year. The Napier Mining Co., Ltd., have sunk a vertical shaft to the depth of 113 feet on the crown of the anticlinal on area No. 102. This shaft has cut seven new lodes, saddling over the anticlinal axis, and which never cropped to the surface. At a depth of 100 feet, crosscuts have been carried over 100 feet each way, and from these levels have been started on the several veins cut.

These three companies are under the management of J. E. Hardman, with Wm. MacKintosh, Foreman, and produced 2,944 ounces, during 1892.

The following report of Mr. G. W. Stuart is of interest as showing the success of a short campaign in gold mining in the Caribou district :—

CARIBOU, N. S.

To T. G. McMULLIN, Esq.,  
*President Truro Gold Mining Co.*

The following is my report of operations at your mine for quarter ending December 31st, 1892, and suggestions for future operations.

The former, I trust, will be satisfactory to you, and the latter meet with your approval:—

The tribute lease was purchased and the mine formally taken over on the first day of October. I found the entire plant, machinery in particular, in very bad order, and the most of it inadequate for the work required. To ascertain the prospective value of your mine, I determined to struggle through a month without much extraordinary expense, which I succeeded in doing with much difficulty from numerous break downs. I succeeded in getting  $246\frac{1}{2}$  days' work under ground, and raising 22 tons of quartz, which yielded  $272\frac{1}{2}$  ozs. of gold. This result warranted my conclusion to reconstruct your entire surface plant, for which I made as rapid preparations as possible, continuing mining operations in rather a desultory manner until the 17th of November, when I shut down.

After removing the old machinery I set, by plans furnished me by J. E. Hardman, S. B., a 40 H. P. tubular boiler; a new 30 H. P. engine on eight feet of solid masonry; built a new amalgamating room, and reconstructed all amalgamating appliances; put in a new friction hoist pulley; erected a new Smithy; built a new shaft house and a Manager's office building, and other various changes and improvements. On the 7th of December the new engine and pumps were in motion. On the 14th, the mine was again unwatered and mining resumed. On the 30th, after running 140 hours with 5 stamps, I cleaned up and smelted 750 ozs. of gold from 30 tons of quartz, mined from November 1st until 17th, and from December 14th until 30th, 29 working days of 16 men under ground, representing 462 days' labor.

I must tell you the chief part of this gold came from the rich strike cut at a depth of 75 feet, in your east shaft, which is 180 feet on the lode from your mill shaft, which is now 115 feet deep. The strike is dipping west toward the mill shaft, at an angle of  $45^\circ$ , the lode below the strike is poor, as far as we have proved it. To continue sinking the east shaft and stoping below the strike, which you will readily understand would require to be done in order to follow, would be a waste of money. When by sinking the main shaft 136 feet below its present depth, the strike will be cut, when you will have about 220 feet of it to work upon, the advantage of which I need not mention. I therefore propose to cease work on the strike in the east shaft, and push down the mill shafts. The mill shaft stopes in which the quartz has lately materially improved. This course I shall pursue unless otherwise directed by your board.

The early extraordinary severity of the winter, prevented me from erecting a shaft house, and putting in a pump in the open pit on the lode, 200 feet west of the mill shaft, where the lode is large and shows much stronger indications of great richness, than it showed in your east shaft above the rich strike we have in it. Immediately the spring opens I propose putting this shaft in operation.

I have contracted for 1,200 cords of hardwood, at \$1.50 per cord, and have already delivered at the works over 300 of this.

I herewith hand you all the vouchers, receipts, etc., of expenditures and bank returns for gold, all of which I trust you will find correct.

Net mint returns after deducting mint and bank charges:

1892, Nov. 7th, Gold Bar, 272.50 ounces .....	\$5075.05	
1893, Jan. 7th     "     "     739.85     " .....	13907.01	
		<hr/>
1022.35 ounces.		\$18982.06
Total cost of gold production .....	\$1935.50	
Stock in hand viz:—		
Wood, Tools, Oils, Lumber, etc.....	697.82	
Expense of new buildings, machinery and construction.....	2125.00	
		<hr/>
		4758.32
		<hr/>
		\$14223.74
Add wood, etc., on hand as above .....	\$ 697.82	
New buildings, etc.,     "     " .....	2125.00	2822.82
		<hr/>
Profit since Oct. 1st, 1892.....		\$17046.56

All of which is respectfully submitted.

Yours faithfully,

G. W. STUART,

*Manager Truro Gold Mining Co.*

Caribou, January 10th, 1893.

During the year 1892, the Schools of Instruction have been carried on with gratifying results. The instructors were :—

Alex. D. Ferguson .....	Springhill.
Thos. Blackwood .....	Joggins.
John Johnston .....	Westville.
Alex. McDonald .....	Stellarton.
John W. Sutherland .....	Thorburn.
John Carey .....	Sydney Mines.
Bart Connors .....	Low Point.
Isaac Greenwell .....	Reserve.
Daniel Hardy .....	Caledonia.
R. Anderson .....	Cow Bay.
R. W. Greenwell .....	Bridgeport.

The Board of Examiners appointed under an Order-in-Council, passed July 20th, 1892, comprised :—

E. GILPIN, JR., *Inspector of Mines.*

#### CUMBERLAND DISTRICT.

James Baird, Joggins Mines, William Wilson, and Robert O'Rourke, Springhill.

#### PICTOU DISTRICT.

H. S. Poole, and John Rutherford, of Stellarton, and William Lorimer, of Westville.

#### CAPE BRETON DISTRICT.

William Routledge, Sydney, Henry Mitchell, Old Bridgeport, and Alex. B. McGillivray, Little Glace Bay.

At an examination held in the fall, the following candidates passed :—

Holder's Name.	Address.	Nature of Certificate.
Ferguson, A. F. ....	Springhill, Cumb. Co.,	Under Manager.
Ferguson, Archie T. ....	" " ..	" "
Hargreaves, James. ....	" " ..	" "
Fletcher, John ....	" " ..	" "
Smith, B. ....	Joggins Mines, " ..	" "
Weedy, Robert. ....	" " ..	" "
McLeod, John. ....	Lorway, C. B. Co ....	" "
Wilson, Henry ....	Reserve Mines, " ....	" "
Sullivan, Michael ....	Sydney " " ....	" "
Edward, Lockman ....	" " " ....	" "
Christiansen, Peter. ....	" " " ....	" "
Connors, Joseph. ....	Victoria, " " ....	" "
Wilson, Benjamin. ....	" " " ....	" "
Wilson, William S. ....	Bridgeport, " ....	" "
Daley, Jeremiah. ....	Westville, Pictou Co..	" "
Gray, Wm. W. ....	" " ..	" "
Farnsworth, Thos. ....	" " ..	" "
Muir, Michael. ....	Stellarton, " ..	" "
McKenzie, Wm. H. ....	" " ..	" "
Brown, James. ....	Thorburn, " ..	" "
Fraser, James E. ....	" " ..	" "
Webster, David ....	" " ..	" "
Lee, John William ....	Springhill, Cumb. Co..	Overman.
Lambert, Jas. M. ....	" " ..	"
Jones, Moses. ....	" " ..	"
Murray, Wm. ....	" " ..	"
Doyle, Edward. ....	Joggins Mines, " ..	"
Munro, John. ....	Reserve " " ..	"
Strag, Jno. T. ....	Gardener " " ..	"
O'Deady, James ....	Bridgeport, C. B. Co..	"
Sutherland Alex. ....	Westville, Pictou Co..	"
Johnston, Thomas ....	Westville, " ....	"
McKenzie, Rod. ....	" " ....	"
Stewart, Thomas ....	Stellarton, " ....	"
Weir, Charles. ....	Thorburn, " ....	"
McIntosh, Jas. W. ....	" " ....	"
McDonald, Norman. ....	" " ....	"
Cameron, Alex. ....	Bridgeport, C. B. Co..	"

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## THE AUSTRIAN FIREDAMP COMMISSION.

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The care with which the researches and experiments were prosecuted lend so much more interest to the conclusions arrived at by the Austrian Commission, as that body was able to turn to account the researches of other firedamp commissions as a starting point, although checking those conclusions which appeared open to discussion, in addition to its personal and original investigations. The conclusions of the Commission present a complete summary of the present state of knowledge on all questions connected with firedamp, and form a set of regulations like the *Principes à Consulter* of the French Commission. In the following note, the most original portions of the Austrian Commission's report are summarized under the following heads:—(1) "Properties of Firedamp under Circumstances which Influence its Disengagement;" (2) "Experiments with Safety Lamps;" (3) Tests of Firedamp Indicators;" (4) "Experiments with Explosives."

### 1.—PROPERTIES OF FIREDAMP UNDER CIRCUMSTANCES WHICH INFLUENCE ITS DISENGAGEMENT.

*Composition and Properties of Firedamp and Aircurrents in Fiery Mines.*—A large number of analyses of gas from blowers fully confirm the fact that *methane* or protocarbide of hydrogen is the only carbide normally disengaged by coal. These analyses do not differ essentially from those of blowers made by the Prussian Commission, excepting those of Oberkirchen, which show the very high content in *athane* (or hydrate of ethylene) of 37.62 per cent.; but hydrogen was not found in any blower of collieries proper; and was only met with in small quantities in a blower at the lignite mine of Trifail. The gases obtained from coal by means of boreholes showed a different composition, according as they were taken from the face of a working place freshly opened, or from the old pillars; while the former showed a composition very near those of the blowers, that of the latter gave evidence of considerable diminution of *methane* with corresponding increase of carbonic acid, due to the oxidising influence of the atmosphere. These gases, given out by the lignites, are very rich in carbonic acid and nitrogen, either on account of frequent accumulations of carbonic acid in the coal, or owing to its being more readily oxidised by the air. The Austrian Commission also studied the composition of the gases given out by coal heated in water to boiling point; and numerous analyses, chiefly undertaken with the object of determining the danger of dust from each kind of coal, have shown that, among the gases contained by lignite, it is generally carbonic acid which predominates (36.78 to 89.65 per cent.), while in the coals it is *methane* (protocarbide of hydrogen) which occurs in the largest proportion, carbonic acid varying between 1 and 56 per cent. As regards the quantity of gas, while 100 grammes (3½ oz.) of lignite

have always yielded less than 1 cubic centimetre (0·061 cubic inch) of gas, coal has given out as much as five times that quantity, often containing a certain amount of *ethane* (hydrate of ethylene). It has been proved that coal, entirely deprived of gas by being kept for a long time in a vacuum, never reabsorbs, when placed in *methane* at atmospheric pressure, as much gas as it has disengaged. Numerous analyses of air-currents in mines show that, on account of the oxidising action of air on coal, the quantity of oxygen, as compared with that of nitrogen, is always slighter than its proportion in pure air. Interesting experiments were also made on the pressure given out by gases evolved from a borehole fitted with a tube and pressure gauge, 5½ atmospheres having been obtained with a bore 7½ m. (24½ ft.) deep, and 9·2 atmospheres with a bore of 6½ m. (21 ft.) It was also ascertained that the pressure, slight at the surface of the coal, increased rapidly with the depth of the hole.

*Various Influences at Work on the Disengagement of Firedamp.*—Numerous experiments were undertaken to determine the relative importance of all the factors capable of exerting an influence on the disengagement of firedamp, the most important being those of M. J. Mayer, which definitely set at rest the question as to the importance which must be attributed to bringing down the coal and to the state of the atmosphere underground and at the surface (barometric pressure, temperature, dampness) on the disengagement of firedamp. These experiments were carried on simultaneously at six collieries—(1) in districts without any considerable vacant spaces due to old workings, selected from two very fiery mines and from three containing very little firedamp, and (2) in a district containing a considerable amount of vacant space due to old workings. In each of these six districts the return air-currents were observed for about a month, at a point where the diffusion of gas might be considered complete, and the content of the gas in the current as constant. Three times a day the volume of the air-current was measured, and a sample taken for analysis as to the proportion of *methane* and carbonic acid; variations of barometric pressure were taken on the surface and underground, those of the latter closely following the former; observations of the temperature and the degree of moisture were made underground and on the surface; the number of men and horses in the districts was observed daily; calculation was made of the quantity of coal got from the working-places at each shift, giving by difference the quantity of coal left in the mine until the next shift; the surface of coal laid bare by pushing forward the headings of each shift was measured; and observations were taken on the surface of the state of the atmosphere. The return air of the most fiery district was found to have a mean content of 1·51 per cent. of firedamp (with 0·103 of CO<sub>2</sub>) and to give out in twenty-four hours 211·6 cubic metres (7,473 cubic feet) per ton extracted; while the least fiery had a mean content of 0·327 per cent. of firedamp (0·066 of CO<sub>2</sub>) and gave out in twenty-four hours 14·7 cubic metres (520 cubic feet) of firedamp per ton extracted. The volume of air was measured by a Cassella anemometer correct to within 5 per cent., the analyses giving a sufficient degree of correctness, namely, to the 1000th part. The greatest cause of error lay in



the sudden and often considerable variations in the air currents, and the impossibility of knowing exactly with what speed the content obtained by the analyses corresponds, as the actual content at a given point in a working is due to gases evolved several minutes previously in the working-places, when the speed of the air-current might have been different. M. Mayer showed that this cause of error might attain 12 per cent. in some cases, so that these experiments could not be relied upon to give absolutely correct results, but only indications useful for practice. The quantity of gas disengaged per ton of coal shows that, in seams very much impregnated with firedamp, the *formene* (marsh gas) is compressed in the coal under considerable pressure, even near the surface; and it is presumable that the variations of barometric pressure which only represent an insignificant fraction of this high tension, must exert a scarcely perceptible influence on the disengagement of firedamp, exerting an appreciable effect only upon seams giving out very little gas. These considerations result, in fact, from the observations made and the diagrams representing them. In the five districts containing no vacant spaces due to old workings, it is not possible to distinguish a certain amount of concordance between the variations of barometric pressure and the percentage of firedamp contained in the return air-current, except in the least fiery seam, in which the quantity of firedamp evolved per minute was on an average from 0.355 cubic metres (12½ cubic feet), when the barometer fell below the mean, and 0.313 cubic metres (11 cubic feet), when it rose above. These variations are, however, very much slighter than those resulting from changes in the volume and speed of the air-current, the maximum content of gas always coinciding with the minimum degree of ventilation. In the case of the other districts it is impossible to distinguish any influence exerted by the barometric pressure, the proportion of gas being dependent on the speed and volume of the air-current. This absence of influence, due to variations of barometric pressure, on the gas given out by a very fiery coal is also proved by the volumes of gas collected in tubes inserted in the boreholes, the volumes collected in equal spaces of time having never shown any ratio to the pressure. On the other hand, in the district containing a considerable amount of vacant space, the curve of firedamp proportions in the return air-current follows the curve of the barometer exactly, and, in this case, as it was easy to foresee, the barometrical variations exert a preponderating influence. M. Mayer deduces from these observations the following law, already put in practice for a long time, that in mines containing vacant spaces due to old workings, a strict watch should be kept upon the return air-current, and that ventilation be increased during considerable variations of barometric pressure. Variations in the content of carbonic acid do not follow those of firedamp; and the pressure of the atmosphere exerts no action upon them. The influence of bringing down the coal is evident; but the absolute value of the content in firedamp of the return air-currents is not in direct ratio with the quantity of coal extracted. Moreover, as the influence of getting the coal is not immediately felt, transitory variations in the quantity extracted exert but little effect; for this influence to be considerable, the output must be forced or restricted



during a certain space of time. As the temperature in the workings varies but slightly, and the degree of moisture in the air not at all, the influence of these two factors is practically *nil*; as to storms and speed of the wind on the surface, they exert no action on the disengagement of firedamp in mines with artificial ventilation. [The author considers that this portion of the Austrian Commission's investigations definitely sets at rest two important questions, viz., that of the composition of gases given out by coal, and that of the influence on their disengagement of various factors, some of which were erroneously supposed to exert considerable influence.]

## II.—EXPERIMENTS WITH SAFETY LAMPS.

In the presence of numerous experiments made by firedamp commissions, the Austrian Commission directed its attention especially to the lamps used in the Ostrau district, that is to say, the Mueseler, Wolf (benzine) and Marsaut, with a few others, the Howat, Morgan and Combessèdes, as well as the Pieler lamp, obligatory in Austria when searching for gas: While the Wolf, Marsaut and Pieler lamps are all identical in construction, the Mueseler lamps used in the Ostrau district vary considerably; the commission therefore adopted a standard type. The experiments were made with mixtures of air and natural firedamp taken from the mine and collected in a gasometer of 3.8 cubic metres (134 cubic feet) the lamps being placed in the mixtures both at rest and moving at greater or less speeds, as the commission was of opinion that results obtained with firedamp would be more conclusive as regards the safety of the lamps than those of other commissions with lighting gas, which is more explosive than firedamp. The author describes the apparatus used for testing the various lamps in explosive mixtures, both at rest and in motion, and also the experiments made with various lamps and the results obtained, and then goes on to say that experiments were also made with inflammable coal-dust, which show that the addition of a very small quantity of dust increases the danger, while, on the other hand, a large quantity diminishes it by giving rise to an excess of combustible gases, which stifle the flame of the lamp. As a rule, brass wire gauze proves more dangerous than that of iron wire. The Austrian Commission concludes from these experiments that the Mueseler, Wolf and Marsaut lamps are much safer than is generally supposed, because, protected by their shields, they were found to withstand the most explosive mixtures, moving at speeds considerably exceeding 10 m. (32½ ft.) per second which is practically the highest met with in fiery mines.

*Observations.*—The experiments of the Austrian Commission, especially with lamps in a more or less rapid current, agree perfectly with those of the French Commission, made with lighting gas in an apparatus which permitted of shaking the lamps and varying the angle at which the current impinged on the lamp, while each experiment might be continued as long as desired. The observations made in an explosive mixture at rest, however, were scarcely sufficient to warrant the conclusions arrived at, as the small volume of the apparatus

did not realise the conditions which are met with in practice, the total extinction of a lamp occurring before the phenomena could be well noted. Nevertheless, the conclusions expressed in this connection by the Austrain Commission are conformable with those of the French Commission, as regards the degree of safety of the various types of lamps experimented with.

### III.—FIREDAMP INDICATORS.

The object of the investigation undertaken by the Austrian Commission, was to turn to the best possible account the halos or rings shown in fiery atmospheres by the three types of lamps most generally used in the Karwin-Ostrau Collieries—viz., the Mueseler, the Wolf, and, for small contents, the Pieler. The observations of the rings were always made in natural firedamp, the most complete being due to Herr R. Schneider, who placed the lamp in a cylinder, (of only a slightly larger diameter than the lamp,) traversed by an explosive mixture of 10 litres (61 cubic inches) in 90 secs. He concluded from his observations that the form and colour of the rings vary (1) with the speed at which the gases circulate in the observation cylinder; (2) with the temperature of the lamps tested; and (3) with the chemical composition of the mixture. Variations in the composition of the liquids used to support combustion in the lamps may also exert an influence on the height and form of the rings, which appears different to the eyes of the observers who have not had the same experience. The Austrian Commission arrives at the conclusion that, with the three lamps above named, the content in firedamp of an air-current may be estimated correctly within  $\frac{1}{2}$  per.cent.; and it lays down limits of percentages of gas for the three lamps above which trying for gas may be dangerous.

While it is to be regretted that the apparatus used did not permit of keeping the lamp for more than a minute and a-half in the determined mixtures, the heights of the rings agree with those observed by the French Commission.

### IV.—EXPERIMENTS WITH EXPLOSIVES.

The Austrian experiments with explosives chiefly bore upon the danger of mine shots in the presence of coaldust, the investigations at Polnisch-Ostrau and Segengottes on the ignition of dust, with or without the presence of firedamp, by means of various explosives, having shown that this danger is even greater than is generally supposed. Attempts were made in vain to determine beforehand the danger of each kind of dust in accordance with its chemical composition and physical properties; but all that could be deduced was the fact that the sensitiveness of dust generally increases with its content of hydrocarbons, which are very inflammable, and also with the degree of dryness, the driest dust producing the longest flame. The experiments showed that dust is generally ignited by a cartridge of 100 grammes ( $3\frac{1}{2}$  oz.) of dynamite, freely exposed to the air or merely tamped with dust, even without the addition of firedamp, while a

similar cartridge charged into a shot-hole without tamping does not generally cause ignition of dust. The length of the flame varies with the nature of the dust, some flames being as long as those caused by a firedamp explosion. All high explosives give results similar to those with dynamite; and all such explosives, either not tamped or merely tamped with dust, generally ignited coaldust, producing effects exactly like those of an explosive mixture of air and firedamp. It follows that the use of high explosives should be considered quite as dangerous in the presence of dust as in that of firedamp; but, while it is impossible to attenuate this danger with lower explosives of the type of ordinary black powder, this is easy with high explosives by adopting simple means, especially tamping with non-inflammable substances, even in a small quantity. The Ostrau experiments on safety explosives showed that the most explosive mixtures, even with the addition of coaldust, were not ignited with a charge of 150 grammes (5 oz.), while charges of 200 grammes (6½ oz.) regularly caused explosions in a 9 per cent. mixture, but never in one of 7 per cent. These experiments therefore go to prove that such explosives possess a less degree of safety than that lately found by the Prussian Commission. Experiments made with "safety" cartridges, in which the high explosive is surrounded by incombustible substances, damped at the moment of firing, have almost always given favourable results; but the Austrian Commission considers their use as of secondary importance, because, with a blown-out charge of 100 to 200 grammes (3½ to 6½ oz.) of dynamite, no ignition took place in 9 per cent. mixtures, provided the shot was tamped with 510 mm. (20½ in.) of damp sand or dried clay. The Austrian Commission considers the Bickford fuse as not sufficiently safe, on account of the possibility of its igniting, if not coaldust, at any rate firedamp is a larger proportion than 4½ per cent.; but it recommends friction igniters, and secondly electric ignition with the usual precautions. To counteract the danger arising from coaldust, the Commission recommends that the working-places be watered, a practice which, properly performed, gives very good results. In dusty mines without firedamp, high explosives should be used, after all collections of dust have been removed by watering or sweeping; and if this is not practicable, safety explosives should be used with a tamping of damp sand. If a small quantity of gas (from ½ to 1 per cent.), be present in addition to the dust, the shot should be fired in such a manner that no flame can issue from the fuse.

*Observations.*—The paper concludes by recapitulating the principal recommendations made by the Austrian Commission as to the fiery mines, which are divided into three classes, determined by the composition of the return air, and recommending a constant observation of the return air generally by safety lamps, especially the Pieler, in experienced hands, the indications being checked by chemical analyses, which alone can give an absolutely correct result, the observations being carefully registered and the volume of air sent into the mine being increased on an increase of gas or a lowering of the barometer being observed.

## PRECAUTIONS AGAINST ACCIDENTS ARISING FROM FIREDAMP.

*General observations.*—As the simultaneous occurrence of three distinct causes is indispensable for bringing about an accident, it follows that, if one only of those causes be completely suppressed, accidents will no longer happen. It is quite out of the question to do away entirely with causes connected with the gravity of accidents—indeed, this could only be accomplished by withdrawing all the men from the colliery, which would involve a complete cessation of working; but it would seem at first sight not impossible to suppress the causes either of the accumulation of firedamp or of its ignition. For a long time efforts have been directed towards suppressing the causes of ignition, and Davy's invention of the safety lamp led to the hope that this desirable result had been attained; but, unfortunately experience has not confirmed these expectations. If accidents have been less numerous since the use of safety lamps, they have, on the other hand, become much more serious, and to such a point as to lead to the assertion that Davy's invention has only increased the danger of colliery working. That is an exaggeration, however. It is sufficient, in order to prove the value of that invention, to compare the number of deaths caused by firedamp with the quantity of coal extracted, which, since the commencement of the century, has increased with marked rapidity—tenfold, indeed—while, happily, accidents have by no means increased in the same proportion.

At the same time, it is no less certain that the safety lamp, by permitting of work being carried on in an atmosphere largely impregnated with firedamp, has been the indirect cause of some frightful catastrophes. All attempts made solely with a view to suppress the causes of ignition are condemned to remain unsuccessful. It is certain that, sooner or later, some act of carelessness will occur, and that the immunity due to the precautions which may have retarded an accident will be practically set off by the greater severity of the accident when it occurs. No more can it ever be hoped to completely suppress accumulations of fire damp. In fact it must, as a rule be admitted that it is quite impossible to entirely do away with any one of the above-named causes of accident; and we must be content to reduce their frequency to a minimum. Moreover, the simultaneous attenuation of these different causes permits of obtaining a degree of security in itself considerable, almost absolute—it is, in fact, the case that, if each of the causes of accidents occurs by itself with tolerable rarity, the probability of their simultaneous occurrence which is indispensable for bringing about an accident, will become infinitely minute. In order to obtain a correct idea of this subject, let us suppose that frequency of firedamp accumulations be equivalent to an accumulation of that gas throughout one whole day out of a thousand working days; and let us also suppose that the frequency of causes of ignition be equivalent to the use of naked lights during one whole day out of a thousand working days. In that case, the probability of the simul-

taneous occurrence of firedamp accumulations and the exposure of naked lights, with reference to the probability of an accident happening, will be as 1: 1,000,000—that is to say, that an accident would occur, on an average every 3,000 years, which may be regarded as practically amounting to absolute security. If, on the other hand, account be only taken of the cause of ignition, without diminishing the causes of accumulation—that is to say, if regular working be carried on in firedamp (as has been too long the practice in collieries, and is not even now entirely discontinued) it will no longer be every 3,000 years that an accident will happen, but every three years. This amounts to saying that the degree of safety will be *nil*; working would become impossible, and the colliery must be abandoned. Although the figures adopted in this calculation are fictitious, they cannot be very far from the reality, and give with tolerable exactitude the limits within which the safety of colliers may be comprised according to the care introduced into their working.

*Precautions against Accumulations of Air impregnated with Firedamp.*—If precautions should be taken simultaneously against the causes of firedamp ignition and also those of its accumulation, it is far from being the case that these two precautionary measures have the same degree of efficiency. The rage for measures calculated to prevent the causes of ignition which result in Davy's discovery, and which has more recently been intensified by the labours of firedamp commissions, has too long caused a neglect of the precautions against firedamp accumulation which might exert a much more efficacious influence. By counteracting the formation of firedamp accumulation even incompletely, both the number and gravity of accidents will be at once diminished. By only reducing the frequency of causes of ignition, it is true that the number of accidents will be lessened; but on the other hand, as was stated above, their gravity will be increased, by permitting the firedamp accumulations to assume larger proportions.

These two opposite effects compensate one another to a certain extent. Moreover, the causes of ignition are at the mercy of hundreds of men often unconscious of danger, and always careless by the mere habit of custom; the very nature of things is opposed to any idea of being able to count upon the prudence of these men. On the other hand, however, the measures that may be taken against accumulations of firedamp depend almost exclusively on the staff directing the mine operations, from the members of which one has a right to expect special guarantees of care and intelligence. Great improvement has been made in this direction during the last twenty years, but there still remains much to be done; and the hope is warranted that by persevering in this direction it will at length be possible to completely do away with those calamitous accidents by explosion, the frequency of which has increased so long as attention has only been directed to averting the causes of firedamp ignition.

Among the measures calculated to prevent firedamp accidents, the following observations only deal in detail with those connected with the ignition of firedamp—that is to say, the least important.



*Suppression of Coaldust.*—It would appear from the preceding observations that the precautions to be taken for lessening the gravity of accidents should be principally directed against coaldust; but, up to the present time, no method appears to have been found really effectual for combatting this danger. The removal of dust from the whole colliery is evidently impossible; but it has been proposed to prevent the dust from rising by systematic watering. Wetted with a sufficient quantity of water to form an adhesive paste, the dust can no longer be held in suspension in the air, and still less be burnt. It should be observed, however, that this watering, to be effectual, must be carried out over the whole colliery, and especially at all the points where dust may lodge, on the floor of the workings as well as on the caps of the timbering; and, on account of the rapid evaporation due to the air-current, this watering must be repeated every day. The weight of water to be thus distributed for compensating the evaporation may be estimated at 1 per cent. of the weight of air circulating through the mine—that is to say, 40 tons per twenty-four hours for a ventilation of 50 cubic metres (1,700 cubic feet) per second. In all the attempts hitherto made, practically infinitesimal quantities of water have been dispensed, which could exert no useful effect. The only practical methods for lessening the gravity of accidents consist in laying out the workings and arranging their ventilation, in such a manner that, in the event of an explosion, the smallest possible number of men shall be overtaken simultaneously. Inasmuch as every man who happens to be in the path of the gases caused by an explosion is fatally lost, a great point should be made of always sending the air proceeding from the fiery regions of a colliery by the most direct way to the return air-shaft, without ever allowing it to follow the trolley-ways, or any other portion of the mine where the men might stay in the ordinary course of working. In the second place, the colliery should be divided into a series of independent districts, each one ventilated by a distinct portion of the main air-current. Lastly, arrangements should be made so that, in the event of an explosion, the ventilation can never be completely suspended throughout the mine by the destruction of the doors and stoppings which serve to direct the air-current. This persistence of ventilation after an accident can only, as a general rule, be obtained by a system of diagonal ventilation, in which the two shafts are placed at the opposite extremities of the field of working. This condition may also be obtained theoretically with two shafts, near to one another, in the case of sharply inclined seams. It is sufficient to leave, between the shafts and the airways in connection with them, a few metres thickness of rock, which is more than sufficient to withstand any explosion. But, as a matter of fact, direct communications are always made between these shafts for the convenience of working; and these communications are never closed, except in a very inefficient manner by wooden doors.

*Colliery Ventilation.*—All the measures calculated to prevent accumulations of firedamp resolve themselves into as perfect a ventilation of the workings as possible. The attempts made to absorb or destroy firedamp have failed; and what is known of the chemical

properties of this gas warrants the assertion that this will continue so for a long time to come, and probably for ever.

The quantity of air necessary to render firedamp inexplorable, must be such that the proportion of the gas in the mixture must be less than 6 per cent.; but, if this limit were observed for the composition of the air leaving the mine, it is certain that the atmosphere would be explosive throughout the underground workings. In fact, of the air which enters the mine, it is only a portion which reaches the working places; and experiments made in the Agrappe Colliery in Belgium have shown the loss of air to be 36 per cent. This amounts to saying that only two-thirds of the air really traverses the workings, while the remaining third passes directly from the downcast to the upcast shaft. In England the loss has been found to be still greater, sometimes exceeding 50 per cent. Lastly, the disengagement of firedamp is irregular from one point to another of the mine; and the mean proportion of firedamp observed on leaving the pit mouth is due to compensations which are effected between mixtures, some of them more impregnated with firedamp, and others less so, than the mean. To avoid accumulations of firedamp in a colliery, it is necessary, therefore, that the air contain much less than 6 per cent. of this gas at the exit. Without its being possible to fix upon an absolute figure, it would seem that, by keeping near 0.5 per cent. of firedamp, the conditions remain favourable. A content of 0.1 per cent. would constitute a magnificent result, which is certainly never attained, even in the best-ventilated fiery mines. The content of 1 per cent. (always corresponding, so far as some special return airways in the most fiery districts are concerned, with contents of at least 2 per cent., which should never be exceeded) is a limit that should never be reached. A fixing of the minimum volume of air necessary in any given fiery mine, can only be determined in a rational manner in accordance with the quantity of firedamp disengaged. These firedamp-measuring (*grisou-metriques*) observations, which are of capital importance as regards safety, should be made every day in fiery mines; and it is to be hoped that in a short time this measure will be generally carried out. At present, however, the mines in which accurate observations of this nature are made, constitute a very small minority. To determine the minimum volume of air necessary, all that is done is to employ empirical methods, which consist in establishing a certain ratio between the volume of air and the quantity of coal extracted or the number of men employed. But the figures quoted above with reference to the disengagement of firedamp show that such ratio is very variable between one minute and another, and also that considerable variations in the activity of extraction cause very little variation in the disengagement of gas.

Subject to these reservations, the minimum volume of air necessary for very fiery mines may be given as 100 litres ( $3\frac{1}{2}$  cubic feet) per second for every ton of coal extracted in the twenty-four hours.

The French Administration of Mines requires that the number of cubic metres of air per second be comprised between one-tenth and

one-twentieth of the daily output. In Belgium this latter limit is so low as one-thirtieth, but, at the same time, it is enjoined to afford no less than from 30 to 50 litres (1 to  $1\frac{3}{4}$  cubic feet) of air actually passing through the working-place for every man in the day shift, or that corresponding with the greatest amount of extraction.

On referring to the experiments of the Prussian Firedamp Commission, which has given for firedamp disengagement figures varying between 10 and 70 cubic metres (353 and 2,472 cubic feet) per ton of coal, it will be seen that the proportion of one-tenth, or 100 litres ( $3\frac{1}{2}$  cubic feet) of air per ton, would give in the upcast shaft a mixture containing from 0.1 to 0.8 per cent of gas, which is well within admissible proportions.

To ensure the ventilation of fiery mines the use of fans should be made obligatory. On account of the insufficiency and irregularity of natural ventilation and the dangers of furnace ventilation their use should be definitely prescribed. These barbarous methods of ventilation will soon have entirely disappeared from fiery mines in France.

The mere fact, however, of sending into the mine a sufficient quantity of air to dilute the firedamp does not alone suffice to prevent accumulations of firedamp; the air current must also be directed to all the points where gas is disengaged, great care being taken to avoid its direct passage from the downcast to the upcast shaft. This is the most critical point in mine ventilation, and one which is still much neglected in too many collieries.

Owing to the necessities of working, every mine is cut up by a large number of headways, among which the air-current has a tendency to divide itself, following by preference those which afford the shortest route from the downcast to the upcast shaft. To make the air-current pass across the new workings, which generally constitute the route of greatest resistance, it is found necessary to close the other ways by means of doors, the working of which cannot be depended upon. The doors never fit tightly; they are often opened for the requirements of working; and they may even, by inadvertance, be left entirely open for a considerable period.

In order to diminish as much as possible the effect of those inevitable acts of negligence, it is advisable to so lay out the workings as to require the smallest possible number of doors and to keep up, even while they are open, a certain amount of ventilation throughout all the districts of the colliery. These two conditions require that the shortest ways by which the air may pass oppose to it a considerable distance, one which is not too slight with reference to that of the normal circuit. One is necessarily led to the arrangement known as diagonal ventilation, the importance of which was pointed out above with reference to diminishing the gravity of accidents. Lastly, the air-doors should, at any rate, be made double, and fitted with such an arrangement of inter-locking as shall prevent the possibility of doors being open at the same time.

The air introduced into the workings in active progress should



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be led up to the face, which is always the seat of a considerable disengagement of firedamp. The continual pushing forward of the working-face, through extracting the coal, greatly complicates the third phase of the ventilation, which is not less important than the two preceding. Ventilation by simple diffusion of the working-places as well as their ventilation by hand-worked fans, ought to be absolutely forbidden, especially in rising stalls. These methods of ventilation, quite insufficient to prevent accumulations of firedamp, have brought about so many accidents that it is astonishing they are still met with in some fiery mines. If, owing to the arrangement of workings, the air-current does not naturally sweep the face, the whole or part of the current must be brought up to the face, either by partitions dividing the stall into two parts, or by sheet-metal pipes, or, better still, by leading the air up by means of secondary ventilators driven by compressed air, as is done at the Blanzky Colliery. This last named arrangement has the great advantage of not requiring fresh doors, and of not increasing the resistance of the general circuit of ventilation; but it has, on the other hand, the disadvantage of being subject to accidental stoppages.

All these precepts apply to new workings; and similar precautions are necessary as regards the old workings, where accumulations of firedamp are all the more to be feared, because no warning is given of their presence; but this subject of old workings still remains an unknown quantity, and is too often neglected. As regards safety, this is often by far the weakest part in the collieries that may otherwise be regarded as well managed and worked. It appears that the only effectual method against the danger of old workings is to gob them completely; moreover the gobbing ought, during the first months and until its complete consolidation, be vented by airways left in the goaf and not too far apart. Under no pretence whatever should ways not gobbled be abandoned in the middle of the goaf, as they may become filled with firedamp several years even after working has ceased. These precautions are of capital importance in thin seams, especially when there are in the neighbourhood "levels of firedamps," or permeable strata containing gas, due to the presence of small seams not worked; but they are of less importance in thick seams where the gobbing is never far from the headings, so that they are ventilated by diffusion. This ventilation of the goaf requires, in mines subject to underground fires, that all the coal be taken out with great care and that none remain in the old workings.

All precautions against accumulations of firedamp and the gravity of accidents are difficult to carry out, because they depend on the general arrangement of the working, which are not at all easy to modify when they have been badly laid out. But these precautions, when taken in a proper manner, ensure a considerable measure of safety, much greater than one would be lead to believe when bearing in mind the unforeseen incidents which may paralyse them accidentally. Experience shows unmistakably that serious firedamp accidents have always disappeared completely so soon as the ventilation has been sufficiently organized. This was first observed in the Gard district, and more recently at the Blanzky Colliery.

IRON MINING.

The New Glasgow Iron, Coal, and Railway Company have now got their works well under way, and return an output of 26,096 tons, and of 5,749 tons of limestone.

The Pictou Charcoal-Iron Company started their furnace late in the fall. They report having mined about 3,000 tons of ore, and 450 tons of limestone. They smelted 415 tons of iron ore with 56 tons of limestone and 33,460 bushels of charcoal, and made 211 tons of pig iron.

The Londonderry Iron Company continued working steadily during the past season.

ORE.

	Men.	No. Days Work.
Skilled workmen underground.....	62	15,425
" " above ground.....	6	1,401
Unskilled " " .....	26	6,092
" " underground.....	33	8,257

LIMESTONE.

Skilled workmen.....	4
Unskilled " .....	14

	Tons.
Skilled workmen.....	37,213
Unskilled " .....	13,538
Ore mined.....	12,742
Coke made.....	27,114
Limestone quarried.....	
Ore received from Torbrook Iron Co.....	

Little work was done at Coxheath during the year 1892. The returns show :—

Skilled labor, underground..... 48 days.

Unskilled " " .....

Skilled " above ground..... 96 "

Unskilled " " .....

Teamsters..... 120 "

COPPER.

Ton S-

## GYPSUM.

The output of Gypsum continued much the same. The Victoria Gypsum Company, of Baddeck, report as follows per W. F. McIntyre:

We have shipped, during the past season, of 1892, 11,940 tons (eleven thousand nine hundred, 100) of which were quarried and shipped from our quarries at St. Ann's and the balance, 10,240, from our quarries at Port Bevis.

The gypsum shipped from St. Ann's was for land plaster. The quality of gypsum from Port Bevis is most excellent, being exceedingly white and pure, and the Plaster of Paris made from it has reached a high reputation in Philadelphia, and in consequence, our orders for next season have been very largely increased.

## WENTWORTH ROCK.

This quarry belongs to the Wentworth Gypsum Co., and is situated in Wentworth, about four miles from Windsor. The yearly output of this quarry is about one hundred thousand (100,000) tons. It is a fine calcining plaster, and is used by all the principal calciners in New York.

### ANALYSIS.

Water .....	20.38%
Carbonic Acid .....	0.25 "
Sulphuric " .....	46.28 "
Lime .....	32.72 "

## NEWPORT ROCK.

This quarry is in Windsor, Hants Co., and owned by the Newport Plaster, Mining and Manufacturing Co., Ltd. It is a white calcining plaster, and of the same grade as the Wentworth or No. 1 plaster, of which there is so much shipped.

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Unskilled "    "    .....	1337 "    "
Teamsters .....	48 "    "
	1529 "    "

Some prospecting was done at Carribou, in the rear of Pictou Town, but no details of the work have been received.

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Carbonic Acid .....	0.25 "
Sulphuric " .....	46.28 "
Lime .....	32.72 "

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## NEWPORT ROCK.

This quarry is in Windsor, Hants Co., and owned by the Newport Plaster, Mining and Manufacturing Co., Ltd. It is a white calcining plaster, and of the same grade as the Wentworth or No. 1 plaster, of which there is so much shipped.

## ANALYSIS.

Water .....	20.62%
Insoluble Matter .....	} .38 "
Silica .....	
Iron .....	} .41 "
Alumina .....	
Sulphuric Acid .....	46.12 "
Lime .....	32.47 "
	<hr/> 100.00 "

## MILLER'S CREEK QUARRY PLASTER.

This quarry is situated in Newport, Hants Co., and owned by the Newport Mining and Manufacturing Co., Ltd. It is a dark blue and is used for land purposes or calcining, being the strongest calcine plaster known. There is not any hard in this quarry.

Sulphuric Acid .....	46.25%
Lime .....	32.38 "
Water .....	20.20 "
Organic Matter .....	0.56 "
	<hr/> 100.00 "

## WALTON ROCK PLASTER.

This quarry is situated in Walton, Hants Co., about twenty-six (26) miles from Windsor, is owned by E. Churchill & Sons, but the output is controlled by the Newport Plaster, Mining and Manufacturing Co., Ltd. It is a blue plaster and makes good calcine plaster for the purpose of making cements such as adamant and King's Windsor. It is also a good land plaster. Did not have an analysis of this rock.

## GYPSUM.

	Tons.	Value.
St. Ann's, Victoria Co.....	1,660	\$ 1,500
Baddeck, " .....	11,784	10,386
Parrsboro Cumberland Co .....	60	30
Arichat, Richmond Co.....	1,030	1,030
Windsor, Hants Co .....	124,531	124,531
Cheverie, " .....	15,891	11,722
Walton, " .....	7,165	6,519
Halifax, " .....	120	390
	<hr/> 162,285	<hr/> \$156,108

	Tons.	Value.
*Pig Iron.—Ferrona .....	6,130	\$
* " Pictou Charcoal Co ...	189	
* " Londonderry Co.....	....	
<hr/>		
	Tons.	Value.
Grindstones, Cumberland Co .....		\$ 9,315
" Pictou Co .....	132	2,375
<hr/>		
	Tons.	Value.
Building Stones, Amherst Customs		15,376
" " Bear River, Digby		
County .....		365
Building Stones, Margaree Inverness		
County .....		100
<hr/>		
	Tons.	Value.
Copper Ore.—Tatamagouche, Col-		
chester County .....	2	
via Halifax .....	24	100

\*Long tons.

## LIMESTONE.

	Tons.	Value.
St. Peter's, Richmond Co.....	4,422	\$ 2,211
Bbls .....	7,283	5,098
North Sydney, Bbls.....	36	75

## MANGANESE.

	Tons.	Value.
Walton, etc., Hants Co .....	90	\$ 6,691
Shipped via Halifax .....	21	2,000

## SAND.

	Tons.	Value.
Windsor .....	175	700

## LEAD ORE.

	Tons.	Value.
Smithfield, Colchester, Co.....	1	200

I have the honor to remain,

Your obedient servant,

E. GILPIN, JR.

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st. Quarter . . . . .	118,866	110,523	75,269	60,859	122,662	15,205	708	218	317,505	186,805
2nd. " . . . . .	107,222	98,036	123,368	112,285	313,174	292,381	216	123	543,980	502,825
3rd. " . . . . .	104,547	96,625	133,116	125,204	357,185	389,639	774	620	595,622	612,088
4th. " . . . . .	127,858	117,463	117,972	107,109	239,843	226,644	.....	.....	485,673	451,216
Total . . . . .	458,493	422,647	449,725	405,457	1,032,864	923,869	1,698	961	1,942,780	1,752,934
1891 . . . . .	521,978	462,267	448,169	405,096	1,074,321	982,392	316	190	2,044,784	1,849,945



TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
NOVA SCOTIA:																
	45,487	72,528	3,330	114,478	104,461	.....	6,718	1,740	.....	386	.....	.....	167,069	178,729	3,330	349,128
Land Sales...																
Sea borne...	3,723	1,653	.....	33,055	3,551	.....	161,422	35,836	34,404	206	.....	.....	199,406	41,040	34,404	274,850
Total, N. S. ....	49,210	74,181	3,330	148,533	108,012	.....	168,140	37,573	34,404	592	.....	.....	366,475	219,769	37,784	623,978
New Brunswick .....	69,049	24,072	50,853	19,460	4,897	.....	41,463	3,819	937	.....	.....	.....	126,972	32,788	51,790	214,550
Newfoundland .....	.....	.....	.....	.....	.....	.....	90,441	2,891	1,697	.....	.....	.....	90,411	2,891	1,697	94,999
P. E. Island .....	.....	.....	.....	8,220	19,001	.....	16,898	11,896	254	369	.....	.....	25,487	30,897	254	56,638
Quebec .....	31,143	16,481	95,560	88,223	9,111	.....	416,730	83,545	5,244	.....	.....	.....	536,096	109,137	100,804	746,037
West Indies .....	.....	.....	.....	.....	.....	.....	2,849	.....	.....	.....	.....	.....	2,849	.....	.....	2,849
United States .....	.....	8,768	.....	.....	.....	.....	2,135	2,980	.....	.....	.....	.....	2,135	11,748	.....	13,883
	149,402	123,502	149,743	264,436	141,021	.....	738,626	142,707	42,536	961	.....	.....	1,158,425	407,230	192,279	1,752,934

## COAL.—SALES.

NAMES.	1st. Quarter.	2nd. Quarter.	3rd. Quarter.	4th. Quarter.	Year 1892.	Year 1891.
Nova Scotia:						
Land Sales . . .	88,051	73,566	77,875	109,636	349,128	360,742
Sea Borne . . .	12,006	68,146	94,606	100,092	274,850	278,995
N. S. Total . . . .	100,057	141,712	172,481	209,728	623,978	639,737
New Brunswick.	40,162	57,626	61,297	55,465	214,550	229,315
Newfoundland .	2,431	21,805	26,485	44,278	94,999	108,617
P. E. Island . . . .	116	15,065	22,049	19,408	56,638	67,473
Quebec . . . . .	43,012	264,048	323,692	115,285	746,037	775,286
West Indies . . . .	418	534	1,166	731	2,849	4,086
United States ..	609	2,035	4,918	6,321	13,883	25,431
Other Countries.	.....	.....	.....	.....	.....	.....
Total . . . . .	186,805	502,825	612,088	451,216	1,752,934	1,849,945
1891 . . . . .	220,658	484,319	709,470	435,498	1,849,945	.....

## COAL.—GENERAL STATEMENT.

1892.	Produce.	Sold.	Colliery Consump- tion.
1st. Quarter . . . . .	317,505	186,805	35,480
2nd. " . . . . .	543,980	502,825	49,765
3rd. " . . . . .	585,622	612,088	48,981
4th. " . . . . .	485,673	451,216	40,866
Total . . . . .	1,942,780	1,752,934	175,092
1891 . . . . .	2,044,784	1,849,945	174,983

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR 1892.

MINES REPORT.

COLLIERY.	Production.	SALES.			Total Sales.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
Chignecto .....	180	54	50	.....	104	.....	56
Joggins .....	63,505	53,875	4,660	.....	58,535	3,264	1,433
Minudie .....	1,844	1,764	20	.....	1,784	30	30
Springhill .....	392,724	93,469	118,772	149,743	361,984	23,509	7,216
Maccan .....	240	240	.....	.....	240	.....	.....
Acadia.....	250,847	132,566	85,537	.....	218,103	28,139	5,496
East River .....	1,975	1,425	.....	.....	1,425	450	100
Intercolonial .....	196,903	130,445	55,484	.....	185,929	• 8,803	2,915
Bridgeport .....	32,230	30,158	1,170	.....	31,328	413	487
Caledonia .....	120,230	75,595	31,605	.....	107,200	2,637	1,559
Gardner .....	41,636	33,059	6,426	.....	39,485	1,700	838
Glace Bay .....	105,617	85,523	8,167	.....	93,690	9,622	888
Gowrie .....	154,845	111,638	26,775	.....	138,413	6,091	5,773
International .....	111,856	79,530	25,949	.....	105,479	3,660	1,840
Ontario .....	28	28	.....	.....	28	.....	.....
Reserve .....	154,790	121,365	14,471	.....	135,836	14,118	3,684
Victoria.....	121,638	54,919	10,877	42,536	108,332	9,685	3,876
Sydney .....	189,994	146,811	17,267	.....	164,078	14,949	11,364
Rankine .....	1,248	949	.....	.....	949	87	40
Sea Coal .....	450	12	.....	.....	12	304	36
Total .....	1,942,780	1,153,425	407,230	192,279	1,752,934	127,461	47,631

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1872	154,092	\$ 75
1851	116,274	"	1873	264,760	"
1852	87,542	"	1874	138,336	"
1853	120,764	"	1875	89,746	"
1854	139,125	Free.	1876	71,634	"
1855	103,222	"	1877	118,216	"
1856	126,152	"	1878	88,495	"
1857	123,335	"	1879	51,641	"
1858	186,743	"	1880	123,423	"
1859	122,720	"	1881	113,728	"
1860	149,289	"	1882	99,302	"
1861	204,457	"	1883	102,755	"
1862	192,612	"	1884	64,515	"
1863	282,775	"	1885	34,483	"
1864	347,594	"	1886	66,003	"
1865	465,194	"	1887	73,892	"
1866	404,252	"	1888	30,198	"
1867	338,492	\$1 25	1889	29,986	"
1868	228,132	"	1890	50,854	"
1869	257,485	"	1891	25,431	"
1870	168,180	"	1892	13,883	"
1871	165,431	"			

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

*Nova Scotia Coal Sales, from 1785 to 1892 (Inclusive.)*

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw d 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	1847	201,650	1,533,798	
1792	2,143	1848	187,643		
1793	1,926	1849	174,592		
1794	4,405	1850	180,084		
1795	5,320	1851	153,499		
1796	5,249	1852	188,076		2,399,319
1797	6,039	1853	217,416		
1798	5,948	1854	234,812		
1799	8,947	1855	238,215		
1800	8,401	1856	253,492		
1801	5,775	51,048	1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130		1861	326,429	
1806	4,938		1862	395,637	
1807	5,119	70,442	1863	429,351	7,317,430
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744	91,527	1869	511,795	13,910,136
1814	9,866		1870	568,277	
1815	9,336		1871	596,418	
1816	8,619		1872	785,914	
1817	9,284		1873	811,106	
1818	7,920		1874	749,127	
1819	8,692	140,820	1875	706,795	1,849,945
1820	9,980		1876	634,207	
1821	11,388		1877	697,665	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825		1881	1,035,014		
1826	12,600	1882	1,250,179	1,752,934	
1827	12,149	1883	1,297,523		
1828	20,967	1884	1,261,650		
1829	21,935	1885	1,254,510		
1830	27,269	1886	1,373,666		
1831	37,170	1887	1,519,684		34,899,051
1832	50,369	1888	1,576,692		
1833	64,743	1889	1,755,107		
1834	50,813	1890	1,786,111		
1835	56,434	1891	1,849,945		
1836	107,593	1892	1,752,934		
1837	118,942	Total .....			
1838	106,730				
1839	145,962				
1840	101,198	839,954			

## SUMMARY.

1785 to 1790	14,349	1841 to 1850	1,533,798
1791 to 1800	51,048	1851 to 1860	2,399,319
1801 to 1810	70,452	1861 to 1870	4,927,339
1811 to 1820	91,527	1871 to 1880	7,317,430
1821 to 1830	140,820	1881 to 1890	13,910,136
1831 to 1840	839,954		

GOLD—GENERAL STATEMENT FOR YEAR 1892.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.			Total Yield of Gold.		
					Oz.	Dwts.	Grs.	Oz.	Dwts.	Grs.
Tangier } Mooseland }	2	3172	2	311	..	6	15	103	8	..
Oldham	2	17032	2	2259	1	7	9	3093	13	2
Caribou } Moose River }	4	14309	4	7189	..	6	11	2335	16	10
Stormont	2	18094	1	3625	..	13	18	2482	11	2
Salmon River	1	11702	1	4220	..	4	22	1042	10	..
Sherbrooke	3	4470	2	893	..	4	..	179	8	20
Montague	1	6640	1	1716	1	5	15	2201	10	..
Malaga	2	7772	2	2720	..	19	12	2656	5	14
Waverley	2	9057	1	3154	..	5	17	9006	11	..
Uniacke	3	12006	2	786	2	18	12	2300	..	14
Lake Catcha	2	5284	2	2467	..	8	11	1046	18	16
Fifteen Mile Stream	2	7825	1	2412	..	12	13	1236	17	..
Unproclaimed and other Districts	4	3398	3	800	..	10	7	412	13	..
Total	30	120761	24	32552	..	..	..	19998	3	18

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARIBOU AND MOOSE RIVER.						STORMONT.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	3	1255	50	606	136	9	11	2	1860	74	241	208	6	17
February.....	3	986	35	357	126	2	12	2	1779	71	260	230	4	..
March .....	4	1356	54	491	153	2	12	2	1742	69	380	312	..	..
April .....	4	613	24	534	165	1	8	2	1828	73	362	263	11	..
May .....	4	681	27	852	153	17	12	3	2083	83	384	207	5	..
June .....	4	996	39	724	207	10	16	2	2302	52	314	236	..	11
July .....	4	1458	58	666	245	3	20	3	1663	66	236	175	7	15
August .....	4	1485	59	776	266	15	12	2	1449	57	485	284	13	11
September.....	4	1479	59	567	169	13	..	2	1023	40	320	..	..	..
October .....	4	1259	50	282	350	11	15	2	789	31	320	192	16	5
November .....	5	1294	51	665	206	14	12	2	805	32	338	205	6	..
December .....	4	1447	57	669	144	14	..	2	771	30	305	166	1	11
Total.....	....	14309	....	7189	2335	16	10	....	18094	....	3625	2482	11	2

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	LAKE CATOCHA						FIFTEEN MILE STREAM.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
January .....	2	46	1	45	43	16	1	...	..	300	160	..
February .....	2	48	1	100	59	10	1	...	..	210	100	..
March .....	2	12	0	42	40	6	1	...	..	275	126	..
April .....	2	662	26	45	37	10	1	646	25	175	52	..
May .....	2	783	31	266	209	14	1	858	34	200	83	..
June .....	2	697	27	397	108	18	1	1160	46	300	162	..
July .....	2	609	24	401	138	2	1	1214	48	260	116	..
August .....	2	547	21	359	106	8	1	1273	50	275	116	..
September .....	1	507	20	67	73	7	1	1107	44	260	116	..
October .....	1	594	23	105	114	14	1	862	34	...	..	..
November .....	2	363	14	425	37	19	1	585	23	157	110	17
December .....	2	416	16	215	76	13	2	120	4	...	95	..
Total .....	..	5284	..	2467	1046	18	..	7825	..	2412	1236	17



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MONTAGUE.						MALAGA.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
January.....	..	.....	..	136	140	6	..	.....	..	200	455	2 9
February.....	..	.....	..	140	170	..	..	.....	..	235	288	8 19
March.....	..	.....	..	150	180	..	..	.....	..	348	354	10 ..
April.....	1	910	36	160	168	10	..	1188	47	293	367	19 ..
May.....	1	955	38	170	176	5	..	1160	46	376	279	12 ..
June.....	1	968	38	160	178	4	..	1194	47	361	295	13 ..
July.....	1	1085	43	80	120	5	..	1194	47	236	38	3 ..
August.....	1	1045	41	200	190	..	..	1500	60	280	179	14 ..
September.....	1	1077	43	170	280	..	..	1536	61	102	114	2 10
October.....	1	200	8	115	442	..	..	.....	.....	98	103	5 ..
November.....	1	200	8	133	75	..	..	.....	.....	85	70	16 ..
December.....	1	200	8	102	81	..	..	.....	.....	106	109	.. ..
Total.....	..	6640	..	1716	2201	10	..	7772	.....	2720	2656	5 14



MONTHLY STATEMENT FROM EACH GOLD DISTRICT,—Continued.

MONTH.	SALMON RIVER.										SHERBROOKE.			
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.		
January.....	1	1619	64	400	95	10	2	524	20	100	15	0	0	
February.....	1	1440	57	350	113	0	2	140	5	47	7	15	0	
March.....	1	1453	58	400	90	0	2	928	37	33	8	12	0	
April.....	1	1236	49	375	110	0	2	435	17	73	16	12	10	
May.....	1	1155	46	290	80	0	2	143	5	31	6	0	0	
June.....	1	1094	43	280	65	0	3	93	3	35	4	2	0	
July.....	1	....	..	250	50	0	.	...	..	24	6	15	0	
August.....	1	....	..	300	70	0	.	...	..	13	0	17	0	
September.....	1	....	..	325	78	0	2	664	26	76	30	5	0	
October.....	1	1188	47	400	86	0	3	1287	51	122	41	3	10	
November.....	1	1262	50	450	95	0	1	232	9	305	38	17	0	
December.....	1	1255	50	400	110	0	2	24	0	29	3	10	0	
Total.....	....	11702	....	4220	1042	10	....	4470	....	893	179	8	20	

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WAVERLEY.						UNACKE.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
January.....	1	...	32	...	...	..	2	2373	94	100	131	0
February .....	1	770	30	...	...	..	2	1646	65	82	68	10
March .....	1	935	37	...	...	..	3	1484	49	120	395	0
April .....	1	930	37	276	105	9	2	1403	56	94	313	10
May .....	1	1088	43	461	109	2	2	1159	46	75	267	4
June .....	1	1269	50	508	154	14	2	1301	52	108	198	13
July .....	1	947	37	408	76	0	3	856	34	35	37	13
August .....	1	1312	52	425	136	18	3	907	36	90	369	6
September .....	1	1198	47	540	148	0	2	877	35	36	176	11
October .....	1	173	6	536	176	8	..	....	..	30	179	14
November .....	1	195	7	...	...	..	..	....	..	16	162	18
December .....	1	240	9	...	...	..	..	....	..	...	...	..
Total .....	..	9057	..	3154	906	11	..	12006	..	786	2300	..
						0					14	

## GOLD.

## GENERAL ANNUAL SUPPLY.

YEAR.	Total Ounces of Gold Extracted.	Stuff Crushed.	Yield per ton of 2000 lbs.	Total Days' Labor.	Average earn- ings per man per day and year, at 300 working days, \$18 per doz.	
	(Oz. Dwts. Grs.)		(Oz. Dwts. Grs.)		A Day.	A Year.
1862	7275 0 0	6473	1 2 11	156,000	\$0 83	\$249
1863	14001 14 17	17002	16 11	273,264	92	276
1864	20022 18 13	21434	18 16	252,720	1 42	426
1865	25454 4 8	24423	1 0 20	212,966	2 15	645
1866	25204 13 2	32162	15 2	211,796	2 14	642
1867	27314 11 11	31386	17 9	218,894	2 24	672
1868	20541 6 10	32262	12 17	241,462	1 53	459
1869	17868 0 19	35147	10 4	210,938	1 52	455
1870	19866 5 5	30829	12 21	173,680	2 05	615
1871	19227 7 4	30791	12 11	162,922	2 12	636
1872	13094 17 6	17093	15 7	112,476	2 09	627
1873	11852 7 19	17708	13 9	93,570	2 28	684
1874	9140 13 9	13844	13 5	77,246	2 12	636
1875	11208 14 19	14810	15 4	91,698	2 20	620
1876	12038 13 18	15490	15 13	111,304	1 94	582
1877	16882 6 1	17369	19 10	123,565	2 46	738
1878	12577 1 22	17990	13 23	110,422	2 05	615
1879	13801 8 10	15936	17 8	92,002	2 34	702
1880	13234 0 4	14037	18 20	103,826	2 18	654
1881	10756 13 2	15556	12 20	126,308	1 52	456
1882	14107 3 20	12081	12 18	106,884	2 37	711
1883	15446 9 23	25954	10 21	97,733	2 84	862
1884	16059 18 17	25147	12 18	118,087	2 40	720
1885	22202 12 20	28890	15 4	157,421	2 53	759
1886	23362 5 13	29010	16 2	128,880	3 25	975
1887	21211 17 18	22280	19 11	173,448	2 20	660
1888	22407 3 10	36178	15 21	163,772	2 46	738
1889	26155 6 13	39160	17 22	211,548	2 22	666
1890	24358 9 9	42749	11 9	160,164	2 73	719
1891	23391 .. ..	35212	13 7	149,381	2 80	840
1892	21080 3 18	33633	12 10	120,761	....	...
	551146 3 18	762036	.....	4,745,108	.....	.....

## INTERCOLONIAL RAILWAY.

*Statement showing number of Tons of Coal received at the following Stations, from Mines in Nova Scotia, for Year ending December 31st, 1892.*

Destination.	No. of Tons.	Destination.	No. of Tons.
Halifax .....	46,395	Londonderry .....	77,668 $\frac{3}{4}$
Dartmouth .....	12,319 $\frac{1}{2}$	Wentworth .....	12
Bedford .....	678	Greenville .....	6
Windsor Junction ..	11,306	Oxford ..	830
Wellington .....	48 $\frac{1}{2}$	Pugwash .....	589
Enfield .....	444	Wallace .....	189
Elmsdale .....	179	Tatamagouche .....	235
Milford .....	42	Denmark .....	335
Shubenacadie .....	420	River John .....	496
Stewiacke .....	624	Scotsburn ..	380
Brookfield .....	80 $\frac{1}{2}$	Scotch Hill .....	13
Truro .....	10,045	Pictou .....	12,520 $\frac{1}{2}$
Murray's Siding ...	6	River Phillip .....	18
Valley .....	18	Spring Hill Jet ...	20
Riversdale .....	12	Athol .....	6
West River .....	66	Maccan .....	32
Glengary .....	18	Nappan .....	12
Hopewell .....	1,413	Amherst .....	8,968
Eureka Junction ...	9,618 $\frac{1}{2}$	Aulac .....	280
Stellarton .....	8,402	Sackville .....	3,136
Sylvester .....	58	Dorchester .....	784 $\frac{1}{2}$
New Glasgow .....	6,445	Memramcook .....	132
Trenton .....	153,919	Painsec Junction ...	6
Pictou Landing ....	52,104	Shediac .....	244
Woodburn .....	12	Moncton .....	19,629 $\frac{1}{2}$
Merigomish .....	196 $\frac{7}{8}$	Salisbury .....	1,274
Avondale .....	30	Petitcodiac .....	566
James River .....	39	Penobsquis .....	18
Antigonish .....	2,470	Sussex .....	237
South River .....	26	Apohaqui .....	6
Heatherton .....	79 $\frac{1}{2}$	Norton .....	129
Bayfield .....	47	Bloomfield .....	6
Tracadie .....	105	Passekeag .....	6
Harbor au Bouche ..	69	Hampton .....	301
Mulgrave .....	1,789	Rothsay .....	42
Belmont .....	38	Cold Brook .....	4,816
Debert .....	6	Saint John .....	2,658
East Mines .....	6	Harcourt .....	30

INTERCOLONIAL RAILWAY—*Continued.*

Destination.	No. of Tons.	Destination.	No. of Tons.
Kent Junction . . . . .	331	St. Arsene . . . . .	6
Chatham Junction . .	1,528	River du Loup . . . . .	1,283½
Millerton . . . . .	24	St. Alexandre . . . . .	6
New Castle . . . . .	18	St. Charles Jct . . . . .	20
Gloucester Junction .	537	St. Henry Jct . . . . .	21,788
Bathurst . . . . .	79	Chaudiere Jct. . . . .	65,379
Petite Roche . . . . .	18	Levis . . . . .	62
Jacquet River . . . . .	18	Point Levis . . . . .	7,242
New Mills . . . . .	48	G. T. R. via Chaud're.	30,997
Charlo . . . . .	6	C. P. R. St. John . . .	655
Dalhousie . . . . .	12		
Campbellton . . . . .	48	Total . . . . .	581,136¾
Metapedia . . . . .	595		
Amqui . . . . .	6	Forwarded from	
Little Metis . . . . .	6	Maccan . . . . .	12,011
St. Octave . . . . .	6	Spring Hill . . . . .	223,134
St. Flavie . . . . .	12	Stellarton . . . . .	171,396¾
Rimouski . . . . .	12	New Glasgow . . . . .	148,386
Bic . . . . .	6	Westville . . . . .	26,209
Trois Pistoles . . . . .	69		
St. Eloi . . . . .	18	Total . . . . .	581,136¾
Isle Verte . . . . .	6		

INTERCOLONIAL RAILWAY.

Statement showing the different kinds of Coal (in Tons) received from the various Mines for the use of the Intercolonial Railway, during the year 1892.

MONTH.	Canada Coal Co., "Joggins."		Canada Coal and R'y Co., Fundy, "Joggins." "Maccan."		Spring Hill.		Acadia.		Inter-colonial Co., "Drummond"		G. M. Assoc'n Sydney Mines.		International, "Sydney."		"Cardiner," Sydney.	
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.
January	2229	114			6742	732	1797	28	2428	105			292	40	454	
February	3350				8363	1122	1662	87	2624	14			70		409	
March	1809				8306	1890	1522	6	2414				130		325	
April	2191	150			2159	329	2615	57	1552				10		20	
May	3583	796			1087	256	3829		1135				166		460	
June	3741	96			2392	283	4268	69	5478				203		115	
July	3818	51			4794	649	2252	168							145	
August	4447				2841	646	4352	92					233		220	
September	4435				5904	796	2793	15			209		164		270	45
October	3632				4351	1129	3198	14			311		106		107	50
November					6820	1024	5475	82			92		241		15	
December					9162	1005	6531	39			273		401		52	
	33235	1207	9002	55	62921	9861	40294	657	41	16190	119	885	2016	40	2588	95

General Storekeeper's Office,  
Moncton, N. B.,  
19th January, 1893.





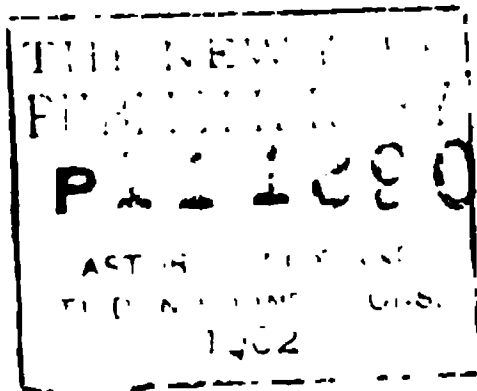


**REPORT**  
**OF THE**  
**DEPARTMENT OF MINES,**  
**NOVA SCOTIA,**

**FOR THE NINE MONTHS ENDING SEPTEMBER 30, 1893.**

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**HALIFAX, N S.:**  
**COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.**  
**1894.**



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# DEPARTMENT OF MINES.

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## REPORT FOR NINE MONTHS ENDING SEPTEMBER 30, 1893.

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*To His Honor MALACHY BOWES DALY, Esquire, Lieutenant-Governor of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,

*Commissioner of Public Works and Mines*

HALIFAX, *December 1st, 1893.*





# REPORT

## ON THE

# MINES OF NOVA SCOTIA,

By EDWIN GILPIN, JR., A. M., F. G. S., LL. D.,

Fellow of the Royal Society of Canada, Member of Canadian Society  
of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,  
HALIFAX, *December 1st, 1893.*

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

*Commissioner of Public Works and Mines:—*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia. Under the provisions of Chapter 4 of the Acts of 1893, it is enacted: "Section 1. The public accounts and the reports of the several departments of the Government shall in the present year be made up for a period of nine months, beginning on the first day of January and ending on the thirtieth day of September.

"2. From and after the first day of October, 1893, the fiscal year of the Province shall begin on the first day of October and end on the thirtieth day of September in each year, and the public accounts and reports of the several departments of the Government shall be made up for the year so beginning and ending."

The following remarks therefore apply only to the first nine months of this year, which must be borne in mind in instituting any comparison of output, sales, etc.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia for the year ending September 30th, compared with that for the year ending December 31st, 1892:—

	Year ending Sep. 30, 1893.	1892.
Gold .....	14,030	19,998
Iron Ore.....	66,837	75,000
Manganese Ore.....	114	111
Coal raised* .....	1,682,713	1,942,780
Coke made* .....	51,612	55,000
Gypsum† .....	98,247	162,285
Grindstones‡ .....	6,971	11,792
Limestone .....	20,684	20,000
Copper Ore .....	1,250	26

\*Ton of 2,240 lbs.

†Amount exported.

‡Value in dollars.

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

I beg leave to submit the reports of Mr. P. Neville, Deputy Inspector for the Island of Cape Breton, and of Mr. William Maddin, Deputy Inspector for the Counties of Cumberland, Colchester and Pictou. Both these gentlemen have repeatedly visited the mines in their districts, and have found a general willingness on the part of the owners, &c., to keep things in good order. Mr. Maddin also visited some of the gold mines during the summer. The work of Messrs. Maddin and Neville has been performed with care and tact, and their presence has occasionally lessened the friction which will sometimes occur in mine management.

I venture here to suggest that the gold mines' inspection should be made more often, and that the districts, especially the larger and older ones, should be mapped. That the maps should show approximately the position of the shafts, openings, &c., and the depth and extent of workings. The surface of many of our mining districts is cut and trenched in every direction, and in a few years' time difficulty will be experienced in sinking anywhere in the centre of the larger districts. The work would be invaluable in future years for reference, and incidentally yield information as to contents of veins, &c., of great interest. As the districts have the positions and boundaries of the leases more or less defined, the time and expense of such a survey would not be heavy.

I would also report that during the year the system of examining and granting certificates to miners and shot firers has been successfully continued. The Board of Examiners for granting certificates to enginemen has been organized, and has held its first examination. The members of the Board are Mr. James Lloyd, of Westville; Mr. Jno. George Barrington, of North Sydney; and Mr. William Wilson, of Springhill. The examination was held simultaneously at Stellarton, Springhill and Sydney on October 4th, and proved successful. A list of the candidates receiving certificates will be found further on in this report. Instructors were provided for the candidates at Westville, and Bridgeville, in the County of Pictou. The enginemen in these districts have so highly appreciated the advantages of the instruction given, that they have petitioned the Government to provide a course of instruction during the winter months. There are at present ten instructors preparing candidates for examination for certificates as underground managers and overmen.

Steps have been taken to give effect to the law requiring managers to hold certificates. The Board of Examiners for colliery officials have had the matter placed in their hands by an order in Council, and have appointed a date next spring for the first examination.

When this has been carried out it is to be hoped that the ample

legislation given to the different grades of those occupied about our mines, Managers, underground managers, overmen, enginemen, shot firers and miners will reward the care and attention given to this matter. The Province can then fairly claim to have put in practice, so far as I am informed, the most advanced legislation in this section of the Mining Art. The care and attention thus directed to those occupied in our mines should produce a body of men harmoniously working, in their respective grades and duties, for the safety of the mines, the protection of life, and the most economical extraction of coal, &c.

## COAL TRADE.

No comparison can be offered this year as regards sales of coal to various points, but the satisfactory state of the business can be inferred from a comparison of the production and sales of the year ending Sept. 30th with the same period in the year 1892.

	1892.		1893.	
	Produce.	Sold.	Produce.	Sold.
1st quarter . . . . .	317,505	186,805	405,773	245,953
2nd quarter . . . . .	543,980	502,825	580,466	525,869
3rd quarter . . . . .	585,622	612,088	696,474	714,102
	1,447,107	1,301,718	1,682,713	1,485,924

This shows that up to September 30th the sales exceeded those of the preceding year up to Sept. 30th by 184,206 tons.

The sales for the same period were as follows :—

Nova Scotia . . . . .	Tons . . . . .	467,928
New Brunswick . . . . .	" . . . . .	195,579
Prince Edward Island . . . . .	" . . . . .	42,419
Newfoundland . . . . .	" . . . . .	43,841
Quebec . . . . .	" . . . . .	719,805
West Indies . . . . .	" . . . . .	220
United States . . . . .	" . . . . .	16,099
Other Countries . . . . .	" . . . . .	33
Total . . . . .		1,485,924

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### CUMBERLAND COUNTY.

In Cumberland County the sales amounted to 353,401 tons. Of this amount 107,041 tons went to Quebec. The Joggins raised 70,138 tons, and Springhill 333,009 tons.

At the Springhill Collieries work has continued as usual, and the preliminary work has opened up a large extent of coal.

The system of transportation from Parrsboro' to St. John and other ports at the mouth of the Bay of Fundy by barges has been in operation successfully during the summer. It is expected that the powerful tug recently built for the company will be able to tow almost without interruption during the winter.

The Canada Coals and Railway Company, limited, has, since the date of my last report, acquired the Joggins, Milner, Patrick, and other leases, and will operate on an extended scale. A new opening is being made on the Joggins seam, houses built, etc.

The district lying east of the Oxford seam as far as Wentworth Station has been the scene of some prospecting. Three seams have been found at Thompson, and the results have been considered encouraging.

It has been stated that near Greenville Station the outcrop of a five feet seam of coal has been found. A number of areas were taken up at Apple River, supposed to be on the southern outcrop of the basin, but I am not aware of any work having been done.

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### PICTOU COUNTY.

The sales to September 30th were 339,163 tons, and do not present any features of interest.

The production of the Acadia Company was 205,193 tons; that of the Intercolonial Coal Company 169,852 tons.

No attempts have yet been made to re-open the Ford pit workings. The operations at the Scott pit of the Intercolonial Company were marked by a curious accident. A discharge of lightning caused an explosion of gas in the workings, but as the pit had been standing for some time no loss of life occurred. Mr. Maddin refers fully to it in his report, and in the next issue of the Departmental report I trust to be able to present you with the details of the accident as recently communicated by the Manager, Mr. Fergie, to the Nova Scotia Mining Society.

The following is an analysis of the coal of the new seam:—

Moisture .....	1·38
Vol. Comb. Matter .....	23·83
Fixed Carbon .....	65·83
Ash .....	8·96
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Sulphur .....	·906

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I beg to submit herewith the report of Mr. Maddin, Deputy Inspector, on the collieries of Pictou and Cumberland Counties:—

WESTVILLE, N. S.,

2nd October, 1893.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines,  
Province of Nova Scotia.*

DEAR SIR,—I have the honor to send you herewith a report on the mines in the District of Pictou, Colchester and Cumberland, from 31st December, A. D. 1892, to 30th September, A. D. 1893.

### INTERCOLONIAL COAL MINING COMPANY.

#### THE OLD SLOPES.

In this mine all the coal has been drawn from the 3,000 feet lift that will be drawn for some time, and the plant removed to the 3,600 feet lift. On the north side the levels having been driven to the line, the pillars are now being extracted, and on the south side the levels were driven 2,600 feet, and they are now beginning to extract the pillars. An engine has been placed on the 3,000 feet level, near the slope, from which the rope is carried on small pulleys along the mine bord to the inside back balance. The cage is taken off the back balance and roads laid into each bord, and the engine lifts up six boxes from the bord at a time and lowers them by friction on to the level at the 3,600 feet lift, from whence they are taken 24 at a time by a tail rope out to the landing. This is an expeditious way of handling the coal, and cheaper, I think, than by cages. Three employees with the engine are doing the work formerly done by ten employees and a horse. No accidents have occurred during the past season, and very good work has been done. A new screen, which gives good satisfaction, has been erected. Some timbering and repairing has been done in No. 4 slope, with the intention of opening it again if required. As the water supply ran very low and became nearly exhausted arrangements have been made with the town of Stellarton for supplying water, and pipes are now laid connecting the works with the Stellarton reservoir, a distance of about 2 miles. They have also enlarged their storage capacity for water at the mine.

#### SCOTT PIT.

Not much work has been done in this pit for the past season, the sinking on the slants to which I referred in my last report being continued until the weather became warm, when, as this seam gives off a considerable amount of gas, it was deemed advisable to stop further sinking and put the mine in good order. Accordingly the men were taken out and started to work in the old slopes, and as the furnace hitherto used to ventilate this pit was not considered perfectly

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safe, it was taken down, and a fan capable of supplying 1800 feet at sinking force some 2,600 feet down substituted. As that amount of air was not sufficient to thoroughly dilute the amount of gas given off, the management decided to let this pit remain idle until the colder weather. It has therefore been idle for some three months, during which time the ventilation has been kept up. The past season being unusually dry, the supply of water became very low, and the management were compelled to make arrangements for a supply of water from Stellarton. Such arrangements were made, but before the pipe laying to complete connections was finished, the scarcity of water became so great that only sufficient could be obtained to keep the old slopes running, consequently the fan in the Scott pit was stopped. On the 8th day of August a very heavy thunder storm occurred and the lightning descended the shaft by the steel wire ropes on the cage, causing a terrific explosion; no loss of life occurred; and the management promptly took every necessary precaution to protect property.

As this is the first explosion in this country caused by lightning, so far as I am aware, I herewith give you a paper from proceedings of the Mining Institute of Scotland, read by David Smith, and taken by me from the "Colliery Engineer":—

"Drumsmudden Colliery is near to the Ayr and Muirkirk Railway, one and one half miles above the Drougan Station, and consists of two pits, each 200 fathoms deep and forty yards apart, having a large pumping engine and coupled winding-engines both under the one roof and built on a stone seat. The height of chimney is 120 feet, and it is fitted with a lightning conductor made of copper seven-eighths inch in diameter. The pumping pit is ten yards from the boiler stalk, and has a pit-head frame forty feet high, over which two pulleys are fixed, guiding the haulage ropes to the pit bottom. There is also a Guibal exhaust-fan connected with this pit. On Wednesday morning, 21st November, 1888, a thunder-storm of unusual and alarming severity burst overhead, and a flash took place at a time when the ascending cage was within twenty yards of the surface. The engine-man was made powerless by the electricity, but, fortunately, had the presence of mind to throw himself on the brake-lever and to stop the engine. When he recovered, he felt pained in arms, neck and shoulders. Probably the fluid ran along the beam of the pumping-engine, then down to the steam pipes which are connected to the winding-engine, and along which it would find its way to the throttle-valve handle. A heavy charge descended the conductor on the stalk, uplifting the earth and ashes at the bottom, but otherwise doing no damage. The pit-bottomer of the winding-pit heard a loud cracking noise and saw a clear bluish flame on the crowns of the roof at the pumping-pit. The signal boy was terrified, seeing fire running and leaping between the haulage ropes and the rails. The chainman was engaged at the time taking down the empty race, and was sitting at the last hutch with his feet on the chain; when about forty yards down he felt a shock



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through his legs, and was pitched on to the road and lay stunned for a time. Twenty yards beyond the foot of the slope door, or 320 yards from the pumping pit bottom, and 240 fathom from the surface, two boys were standing, one having his feet on the rails and his head almost touching the electric bell wires. He got a shock, turning him round about, and both were terrified by seeing fire flying between the rails and wire. They ran off to find the overman. When they found him they were white with fear, and said fire was flying all through the pit. Fortunately no serious injury was done to any of the workmen or property by the above strange occurrence."

During the very able discussion that followed, various instances were spoken of by gentlemen belonging to that Institute, in which accidents of a like nature occurred in England and also in Italy. At the next meeting of the Institute, the secretary read a communication from J. B. Dalzell, the closing remarks of which are especially worthy of attention.

"Two conclusions appear to be warranted by the details of the occurrence at Swinhill, Drumsudden and Alatri; and probably at Rica colliery and Hexham as well. One is, that the base of a lightning conductor should be more than ten or eleven yards from a pit shaft, more particularly a shaft in which there are metal guides, pipes, or wire ropes. The other is, that it should be obligatory on owners of fiery mines to fit up a proper lightning conductor upon the pit head frame of each shaft in which wire ropes are in use, or at which the pit-head frame is of metal. The President said this was another illustration of the danger that arose in connection with fiery pits. He did not see how they were to keep the lightning out of their pits unless by proper conductors. He had known one fitted on a chimney with the lower end merely touching the ground. Well, he supposed it would be better without it. It was well known to scientific men how they should be fixed, and he thought that was a very simple matter to get over. He proposed a vote of thanks to Mr. Smith for his interesting contribution to their Transactions. We have heard of several instances in which lightning has entered mines in the United States during storms. One occurrence was at Mount Carmel, Northumberland County, Pa., a few years ago."

#### SPRING HILL MINES.

*No. 1 Slope.*—The principal work in this slope has been done on the 1900 feet lift and back seam, the coal in west side of old balances is pretty well taken out, and the 200 feet barrier left at the 1,300 feet lift is also being energetically and successfully won. The low coal between the 1900 feet level and stoney level is being taken out very cleanly as the levels are advanced. Some trouble has been experienced from damp in running the coal from the back seam; this difficulty has been overcome, and they are successfully winning the pillars and low coal out of a large area in the back seam. A fault was struck last year in the back seam in the level going west,

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but this was pierced through and the coal obtained again all right. Nothing much is doing on the 2600 feet lift, excepting advancing the levels and driving the places going up to 1900 feet lift for balances and returns. The coal in this lift is very tender and the quality and appearance good.

*No. 2 Slope.*—The drawing of pillars has been continuously carried on here since last year's report, there having been a very large area of pillars to draw, but the most of this has now been very successfully won. In the new lift not much has been done except extending the levels and other necessary preparations; the levels will require to be driven east, upwards of a mile to connect with the Aberdeen slope, and when this is accomplished there will be a large block of coal 1200 feet by say one mile cut clear around. The idea of the management is to have in this new lift the levels extended and the work properly opened up before the coal is all taken from the old lift above. The tail-rope system of haulage mentioned in last year's report has been giving good satisfaction in this mine. The engines in all these slopes are stationary, and the power transmitted from lift to lift; the lower lifts in all three slopes may hereafter require a different system of work from that of the present, owing to the angle being so high and the coal tender with good partings and the superincumbent pressure enormous, it being over 1000 feet perpendicular. It has been hitherto found necessary on attaining great depths in mining to change or adapt the mode of work from what has been carried on nearer the surface, and I am of opinion the rule will be found applicable to all coal mines. Of course the nature of overlying strata and of the pavement will have a great deal to do with this trouble, and must of necessity determine the new plans to be used and adapted, so that it does not of necessity follow that the method adopted in one mine will be equally successful in another. The method followed, to be successful, must be adapted to meet the circumstances in which they are particularly placed.

*No. 3 Slope.*—The level on west side, at the 1,300 feet lift, has now been driven some 6,000 feet, and No. 8 balance driven up and connected with the syndicate slope, and will form a good travelling way as, owing to the large transportation of coal in the level, it is not as free from liability to accident as it is desirable a permanent travelling way should be. A large block of coal on the east side of the 1,300 feet lift, extending up to the 800 feet lift, has been very thoroughly and satisfactorily extracted, and on the west side of the 1,900 feet lift the levels are in 5,000 feet, and No. 8 balance driven up to the 1,300 feet lift, and on the east side the levels are in some 1,300 feet. The work has been here conducted under the Longwall system, and has been attended with good results. Connections have been made with the 1,300 feet lift, one of which is direct on the return from the 1,300 feet lift to the surface. This can be also utilized for a good and permanent travelling way on the east side for the men and boys. The tail-rope method is giving good satisfaction in this mine, and the coal is being taken out very clean.



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There are about 1,000 safety lamps in daily use in this mine. Great care has of necessity to be exercised in maintaining an oversight over such a large number, and some time ago an inspector of lamps was appointed, and in the first six months after such appointment 48 instances were detected of lamps damaged and going down the mine unlocked. These were all closely investigated, and parties were either made to pay damages or sent to police-court according as the circumstances of the case demanded, and for the past six months only 26 cases occurred, and these were caused principally by accident. For the first four months after said appointment, a large number of the glasses of the safety lamps were broken, but such accidents have now been materially reduced, and comparatively few accidents of this nature now take place. The employees, both men and boys, now realize the great importance of keeping their lamps in good order, and at the close of their day's work bring them to the different cabins in good condition.

#### ALBION MINES.

*Third Seam.*—On the south side of the slope in this seam very little work, if any, is being done. On the north side No. 1 balance is completed, and there is now a new double balance, having nine bords on each side, that is eighteen in all, and No. 3 balance is almost ready for work.

On July 24th they began to sink for another lift. The cage pit seam, which is operated by way of the tunnel, has been worked steadily advancing the levels. In March they began "drawing the pillars" on the south side, and are succeeding very well in this work. There is a 4-foot seam overlying these pillars which is worked out successfully under the Longwall system, with only about from 5 to 6 feet of strata between the two seams, and as this is the first work, at least in this county, under such circumstances, I might here say the work has so far proved successful. On the 10th of April two bore-holes 4 inches in diameter were started from the surface to strike the levels on the north side of the cage-pit seam at a depth of 700 feet, and completed on the 14th of July. Ropes are run down through these holes, the intention being to sink down to the dip and hoist the coal to the present level by one of these ropes, the other rope to be used for hauling the coal to the slope. I would further say that during the present year the drifts leading from the cage-pit seam to the Ford pit seam have been built off with brick and stone; this work has been attended with good success. Although considerable gas is given off, the air is kept well up to the working faces, and every working place is thus kept in good condition. The bank-house has undergone some remodelling and new screens of the belt pattern have been erected. The coal will be carried on the belt some 30 feet from the screens to the cars, giving the bank men a good opportunity to clean the coal.

## MCGREGOR PIT.

This mine has been worked continuously with a small force of men, and they are now prepared to draw the pillars in the No. 3 lift, east side, south slant ; ventilation has been well kept up during the year.

## CAGE PIT.

Some preparations were made to open the Cage Pit, but for various reasons this has not been done up to this date.

## FORD PIT

remains partially filled with water.

## JOGGINS MINE.

Work has been steady at this mine during the past nine months. In July of this year, James Baird, Esquire, resigned his position as manager, and William Hall, Esquire, late of Spring Hill Mines, succeeded to the position. Mr. Baird, during his term of office, operated the mine very efficiently and successfully under the longwall system, obtaining a very large percentage of coal and maintaining good ventilation. Mr. Hall, whose standing as a successful mine operator is too well known to need mentioning, has adopted the bord and pillar system.

In reference to the airways spoken of in last year's report, I may say the one through the old workings is not yet completed, and the one on the East side is completed, and will now be used as a hoisting slope ; the coal hoisted will be carried nearly a mile to the screens, there to be cleaned, screened and shipped.

I may here say that the bank-house, which was formerly rather small, has been enlarged, and screens of the Belt pattern erected ; the design of these screens were, I think, obtained by Mr. Baird from those at the Ford pit in the County of Pictou. These improvements give the men ample room and freedom to handle the boxes on the bank-head, and the screens enable them to clean the coal more efficiently than before. Alexander Dick, Esq., late of Spring Hill, is now general manager of this mine.

## ACADIA MINES.

This mine is now worked wholly on the longwall system, and although working from 6 to 7 feet of coal under this system without any stowage, is a somewhat difficult task, they are succeeding in winning out the coal very clean. The temperature varies from 65° to 71° Far. at the working faces. This being one of the deepest, if not the deepest, in the province, (perpendicular depth being from 1,700 to 1,800 feet) unforeseen difficulties are met with in the prosecution of the work. I would venture to say that the successful working of this coal at such a depth affords a striking lesson of the necessity of changing the method of working, when such a depth is attained, in

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order to obtain the best results, although the strata maintains its uniform character. At my request E. Gilpin, Esq., Inspector of Mines on the 6th of July, visited this mine, and I am pleased to state found it in good order and condition. Sometimes serious difficulty is experienced in the ventilation, owing to the airways becoming choked or obstructed by falls from the roof caused by the great pressure, and occasionally large volumes of gas are given off in some places causing anxiety and trouble. The management have now began at the 2400 feet lift to open up the old level and to enlarge the water standing, and to make a part of new return airway, it being next to impossible to maintain the old one in a proper state of efficiency. This level may at some future period be utilized for withdrawing the coal from the old Black Diamond mine. On the surface a new reservoir for holding water has been made, the management having found it necessary to lay pipes from the mine to Bear brook, a distance of about two miles, where they have built a dam and placed a steam pump to force water to the mine for steam purposes.

#### EAST RIVER MINE.

Messrs. Muir and Son worked this mine until March, when they stopped, leaving it in good condition.

#### OLD POTTERY MINE.

Mr. Wm. P. McNeil, of New Glasgow, has re-opened this mine, pumped the water out, and had it all re-timbered, and is now taking out coal.

#### MINUDIE MINE.

This mine was also re-opened, the water being all pumped out, but no coal raised as yet.

#### CHIGNECTO MINE.

Last year 4 or 5 men worked a few months during the winter along the crop.

#### THE CROOKSHANK MINE.

Work was stopped in this mine in May. It is a low seam, and is worked by the longwall system. The coal is considered good.

#### THORBURN.

*Six Foot Seam.*—In this mine, the balance of which I have previously spoken, on the west side has been driven up to the 1,100 feet level, and 10 bords are being worked on it; also, another balance is being driven up inside this one, and the bords turned off. On the east side of same lift (1,800 feet lift) all the coal except the pillars, is about extracted, and the work, so far as that lift on that side is concerned, finished, unless they pierce through the fault.

On the new lift some 15 places are being worked. The coal keeps very low, and makes it expensive. As an addition to this the roadways have to be "brushed" for room, and there is considerable stone to handle.

I may add that the management have been engaged proving another seam of coal known as the 4-foot seam.

In the old McBean slope the water is up to within some 200 feet of the surface which should warrant us in believing that the fire is out.

In the 6 foot seam fire-damp is almost unheard of now and the mine is kept in good condition so far as ventilation is concerned.

In addition to the coal mines I further officially visited and inspected during the same period, to wit, between the 1st January and 30th September, A. D. 1893, the principal gold mining districts.

I beg to remain,

Yours truly,

W. MADDIN, JR.

Amount of Air measured at visits to Mines in Pictou and Cumberland.

Mines.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Third Seam.....	55,423	56,200	55,700	61,000	60,100	58,500	42,500	41,900	42,500	.....	.....	.....
McGregor Pit.....	192,000	121,000	118,000	111,000	100,000	96,700	112,000	110,000	12,000	.....	.....	.....
Acadia.....	60,700	61,500	60,000	58,700	59,000	57,000	50,000	50,100	52,000	.....	.....	.....
Six foot Seam.....	27,500	26,000	24,400	28,900	26,000	27,500	26,600	25,800	26,500	.....	.....	.....
Drummond.....	98,200	97,750	96,800	94,700	97,700	96,000	82,000	81,975	91,000	.....	.....	.....
Scott Pit.....	15,000	15,400	10,750	9,700	Idle.	.....	.....	.....	.....	.....	.....	.....
Springhill Mine, No. 1	72,600	71,400	70,700	68,700	76,000	75,200	57,600	54,700	58,600	.....	.....	.....
" 2	70,200	70,100	69,750	69,000	54,500	53,700	50,400	53,900	50,400	.....	.....	.....
" 3	60,400	58,900	57,950	56,600	71,300	70,000	56,880	55,500	58,400	.....	.....	.....
Joggins.....	35,000	37,440	36,550	54,900	49,900	48,880	44,600	43,700	44,000	.....	.....	.....
Crookshank.....	2,500	2,744	2,000	1,900	1,300	Idle.	.....	.....	.....	.....	.....	.....
Pottery.....	.....	.....	.....	.....	.....	.....	1,300	1,275	1,300	.....	.....	.....

W. M.

OFFICIAL VISITS FROM JANUARY 1, 1893, TO SEPTEMBER 30, 1893.

MINE.	County.	DATE OF VISITATION.											
		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Third Seam .....	Pictou.	12	3	2	4	2	3	5	22	20	.....	.....	.....
McGregor Pit .....	"	3	1	1	3	1	2	4	23	4	.....	.....	.....
Acadia .....	"	24	8	7	7	5	8	6	14	1	.....	.....	.....
Six foot Seam .....	"	10	11	21	24	20	7	7	12	19	.....	.....	.....
Drummond .....	"	4	4	3	5	3	5	20	24	21	.....	.....	.....
Scott Pit .....	"	4	4	21	5	Idle.	.....	.....	.....	.....	.....	.....	.....
Jno. Muir & Son ..	"	10	11	22	Idle.	.....	.....	.....	.....	.....	.....	.....	.....
Springhill { No. 1	Cumberland.	17	14	13	11	9	13	11	18	8	.....	.....	.....
" " 2	"	17	14	14	11	9	13	12	18	8	.....	.....	.....
" " 3	"	20	15	14	12	10	14	12	19	9	.....	.....	.....
Joggins .....	"	14	16	16	13	11	15	14	17	11	.....	.....	.....
Minudie .....	"	Idle.	.....	.....	14	Idle.	.....	.....	.....	.....	.....	.....	.....
Crookshank .....	"	16	17	15	.....	12	Idle.	.....	.....	.....	.....	.....	.....
Chignecto .....	"	27	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Londonderry .....	"	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Pottery Gold Mines. ....	.....	.....	.....	.....	.....	.....	.....	.....	21	18	.....	.....	.....

W. M.

## ACCIDENTS.

No.	Date.	Mine.	Person.	Occupation.	Remarks.
1	Jan. 5.	Albion Mines, 3rd Seam.	R. Bartley.	Miner.	Back hurt by fall of coal.
2	Jan. 10.	Londonderry.	J. Williams.	Miner.	Fatally; explosion of dynamite in drying house.
3	" 10.	"	S. Haskins.	Miner.	Badly hurt; "
4	" 10.	"	S. Beck.	Miner.	Badly hurt; "
5	" 10.	"	H. Wright.	Miner.	Badly hurt; "
6	" 10.	"	C. Eagle.	Miner.	Badly hurt; "
7	" 23.	McGregor Pit.	H. Campbell.	Screen boy.	Leg broken letting down cage from screen.
8	" 27.	Chignecto.	T. Guthers.	Miner.	Finger smashed; amputation necessary.
9	Feb. 4.	No. 3 Springhill.	Thos. Scott.	Miner.	Hurt by fall of stone while working in a pillar.
10	" 21.	Drummond.	J. Matheson.	Conductor.	Head hurt while getting locomotive on track.
11	" 21.	"	J. Nash.	Chain-runner.	Legs hurt by being caught between boxes.
12	Mar. 11.	"	Hector McLean.	Miner.	Back hurt by fall of coal from working-face.
13	April 1.	Springhill No 1.	M. Mahoney:	Miner.	Ankle hurt by fall of stone from working-face.
14	" 7.	" No. 1.	R. Miller.	Driver.	Caught between the rakes.
15	" 7.	" No. 3.	W. Bigney.	Boy on bank.	Head hurt; caught between boxes.
16	" 10.	" No. 3.	Samuel Burt.	Loader.	Leg broken by fall of coal.
17	" 11.	" No. 3.	R. McNeil.	Miner.	Leg smashed; amputation necessary.
18	" 23.	Acadia.	J. Duff.	Sulphur-man.	Hurt by fall of roof
19	May 20.	Vale 6 foot Seam.	— Kenneth.	Miner.	Hurt by fall of stone from roof at face.
20	" 10.	Springhill.	J. Miller.	Miner.	Hurt by fall of stone at working face.
21	" 18.	" 3rd Seam.	H. McKenzie.	Miner.	Hurt by fall of stone at working face.
22	" 22.	Springhill.	J. Simpson.		Foot hurt by trolley passing over it.
23	June 14.	Drummond.	E. Revencher.	Shover on cage.	Leg broken by cage coming on it.
24	" 16.	Springhill.	D. McKenzie.	Miner.	Hurt by fall of stone from working face.
25	" 19.	Drummond	David Wilson.	Chain-runner.	Hurt by empty rake going off track.

## ACCIDENTS.

No.	Date.	Mine.	Person.	Occupation.	Remarks.
26	June 20.	Drummond.	Arch. Wilson.	Chain-runner.	Hurt by empty rake coming in contact with full rake.
27	" 24.	Vale Colliery.	Dan McDonald.	Miner.	Hurt by fall of stone from roof.
28	" 28.	Springhill.	Wm. Coates.	Miner.	Hurt by piece of coal from working face.
29	" 28.	Springhill.	Allan Mills.	Miner.	Leg broke ; fall of coal sinking face.
30	July 11.	Drummond.	D. Morrison.	Driver.	Arm broke ; jammed between box and rib.
31	" 15.	Drummond.	James Curzin.	Roadman.	Arm broke while oiling a wheel.
32	" 19.	Drummond.	Dan Evans.	Miner.	Hurt, getting on siding rake in motion.
33	Aug. 12.	Springhill, No. 1.	E. Weldon.	Miner.	Hurt ; fall of coal from working face
34	" 24.	" No. 3.	James Dunn.	Bottomer.	Foot injured by rake of empty boxes.
35	" 26.	" No. 1.	A. Cunningham.	Shover on.	Hurt ; jammed by empty box.
36	Sept. 8.	" No. 1.	D. Adams.	Boy.	Leg broke while playing on Banhead.
37	" 15.	" No. 1.	John McPherson.	Driver.	Hurt by full rake of boxes.
38	" 16.	" No. 1.	Rory McDonald.	Miner.	{ Hurt by siding trolley.
39	" 16.	" No. 1.	John Hayes.	Miner.	
40	" 19.	" No. 3.	Daniel Campbell.	Bottomer.	Leg hurt ; jammed by full box.



Timber and Explosives used at Spring Hill Collieries from Jan. 31st, 1892, to Sept. 30th, 1893.

Timber.	No. of Pieces.	Size.	Quantity in Ft.	Powder in lbs.	Dynamite in lbs.
Booms.....	16	24" 12"	.....	300	106
".....	31	18" 13"			
".....	1,341	14" 10"			
".....	19,202	14" 6"			
".....	2,530	12" 10"			
".....	3,896	10½" 9"			
Props.....	22,978	12" 5"			
".....	18,707	10" 5"			
".....	27,279	5½" 5"			
Plank.....	.....	.....	271,945		
Boards.....	.....	.....	171,294		
Scantling.....	.....	.....	196,756		
Spruce Timber.....	.....	.....	168,271		
Hardwood.....	.....	.....	53,170		
Slabs.....	.....	6"	12,450		
Cup pieces.....	.....	.....	16,240		
Rollerwood.....	.....	.....	6,000		

Amount of Timber and Explosives used during the nine months ending Sept. 30th, A. D. 1893, at

MINE.	PROPS.	BOOMS.	EXPLOSIVES.					
	Lineal feet.	Lineal feet.	Powder. Lbs.	Flameless Powder. Lbs.	Roburite. Lbs.	Dynamite. Lbs.	Fuse. Ft.	Squibs. Boxes.
Acadia.....	.....	671,300	.....	.....	.....	.....	.....	.....
Albion.....	.....	125,900	.....	11,700	650	.....	84,000	.....
Vale.....	.....	137,870	29,326	.....	.....	.....	1,100	128
Drummond Colliery.....	324,812	72,936	.....	.....	2,168	.....	.....	.....
Joggins } Props and booms inclusive.	.....	590,628	1,250	.....	.....	50	.....	.....

W. MADDIN, JR.

### CAPE BRETON COUNTY.

The sales from this County amounted to 792,762 tons, supplied by the following companies :—

Dominion Coal Co.....	652,833 tons
General Mining Association .....	175,374 “
Low Pt., Barrasois and L. Co.....	75,365 “

Since the date of my last report negotiations have been concluded by which a company called the Dominion Coal Company, Limited, has acquired the properties known as the Gowrie, Ontario, Caledonia, Reserve, International, Glace Bay, Sword, and Gardner Collieries, embracing an area of about forty-nine square miles. This leaves the Sydney Mines and Victoria as the only independent collieries working in Cape Breton Co. The collieries of the new company have been connected with Sydney Harbor by extensions of the International Railway, and the railway is being extended to Louisburg, with the intention of utilizing the harbor as a winter port. The general manager of the new company is Mr. D. Mackeen, M. P., well known for his successful management of the Caledonia Colliery.

This extensive change of ownership naturally caused much interest to be taken in coal, and an immense number of licenses to search were applied for in this county. On a few some prospecting has been done. Mr. Stephens opened a bed containing about three feet six inches of good coal. The Messrs. Cossit proved a seam about four feet thick. On the Murray property, in the rear of Cow Bay, several large seams were reported as passed through by boring. The Messrs. Routledge did some boring to the west of the Lingan area, and are said to have found workable coal. On the North Sydney side of the harbor a seam five or six feet thick was reported near the Little Bras d'Or which should underlie and increase the value of the coal leases in that vicinity.

I submit the report of Mr. Neville, Deputy Inspector for the island of Cape Breton, for the past year :—

E. GILPIN, JR., ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave respectfully to submit to you my report of the coal mines in the island of Cape Breton for the fiscal year ending 30th Sept., 1893 :—

#### INTERNATIONAL.

There has been no notable change made in the underground workings of this mine during the year. The levels and rooms on the north and south sides of the deeps have been extended as usual ; also,

the south side rise workings has been carried on and the tail rope haulage still gives satisfaction. The bank and pit-head frame was destroyed on the 30th day of March last by fire, originating in the blacksmith's shop, which was also destroyed ; however, a new and better heapstead was completed by the 6th day of May, which gives good satisfaction, and also a new blacksmith's shop has been built further from the pit head than the former.

#### GOWRIE MINES.

Levels and rooms as usual have been extended on the south side of the east deep from No. 1 and No. 2 landings. Also, on the west side of this deep the levels on the low lift have been driven about 600 feet and rooms turned off there. From the bottom of the west deep slant a section of rooms has been started due north, up the anticlinal ; the angle of dip is about 17 degrees ; the coal is run down in shoots with sheet iron bottoms, which does well. There has been added to the plant also 2 tubular boilers 5x16 feet and smoke stack, one air compressor 20x24 inch cylinder, 10 coal cutting machines, Ingersoll's make.

#### CALEDONIA.

Work at this mine has been carried on as usual in its orderly way during the year. A new landing has been made at the bottom of the east deep, levels driven on the south side of it, and a large section opened there. Also, No. 4 levels east and west were extended and rooms opened up. There are eight coal cutting machines working, five in addition to the three mentioned in last report. Seven are Ingersoll Sergeant and one Harrison machine, all of which give satisfactory results. During the summer a fan shaft 187 feet deep was sunk ; the shaft is circular in form and has a diameter of 10 ft. A 12 foot Murphy ventilator is now being erected and will be in operation in a few days.

#### LITTLE GLACE BAY.

The dip levels have been extended on the north and south side of the deep slant and about thirty rooms are working there. The west high level has been driven steadily and a large section of rooms opened out there ; also a section of rooms has been opened up on the west side of the main north level. On surface added to the plant there have been two new tubular boilers 100 horse power each, 1 air compressor, 10 Ingersoll coal cutting machines.

#### RESERVE.

There has been no new feature of work at this mine during the year. The levels on the east slope low lift have been extended north and south and rooms opened up there. On the west slope the water has been pumped out of the deep, and about twenty pairs of men have been at work there drawing pillars during the last four months ; the ventilation throughout the mine is good, owing to an improvement by splitting and overcasts made this season.

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**EMERY.**

There is nothing new to note here. The deeps that were being driven have been stopped owing to a band of stone in the coal; the rooms on the east side to the rise of this have been extended. A dip slant has been driven on the west side of the pit bottom down to the level with the intention of hauling the west side deep coal up that way.

**OLD BRIDGEPORT.**

The south levels are now 3,185 feet in from the shaft, having been driven 1,630 feet since the Dominion Coal Co. took charge.

Those levels have only about 150 feet to go until they reach the boundary line between the Reserve and Old Bridgeport.

A coal cutting machine is at present used in driving the back or water level; it is named the improved Stanley Hender.

It makes a cut in a circular form 4 inches wide and 26 inches forward in each cut, and leaving a plug of coal 5 feet 4 inches in dia., making the diameter of the level 6 feet. The machine cuts about 20 feet forward in one shift of 10 hours. It is worked by compressed air at a pressure of 80 lbs. to the sq. inch. The upper level and 4 rooms between those levels are being driven by the Ingersoll coal cutting machines.

The remainder of the places up the slant are all worked by hand as usual, the rooms being 18 feet wide and the pillars 100 ft. x 12 ft. A new furnace has been built this season, which has increased the ventilation. Two new Ingersoll tubular boilers have been erected on the surface 14 feet long by 5 ft. dia., each having 84 tubes 3 in dia. and built in on the improved method known as the Jarvis Furnace.

It is the intention of the management this fall to enlarge the size of the shaft to admit of larger cages and tubs of greater capacity being used, so as to make the output of this pit next season something like 800 or 1000 tons per day. A new engine house, which is to contain winding engine, an underground hauling engine, two compressors, and one emery stone, is to be built this fall, and also a new heap stead 55 feet high.

The boilers will also be covered in by a new shed. A road is being cut to the west of the pit, a distance of 25 chains to a "brook," and 4 inch pipes will be laid down, and a pump erected at the brook to force water up to the pit to supply the boilers.

The brook is about 40 feet below the "Reservoir" at the pit.

**GARDNER MINES.**

There has not been much improvement made at this mine since my last report. An extension of the workings already opened up has been carried forward, and a section of long wall about 300 feet

in width has been worked in at the south level. The roof over the horse road has been taken down a distance of 500 feet in length in addition to what was done before; this gives more room for men and horses to travel there.

#### VICTORIA MINES.

On the 24th of December last, by the bursting of one of the boilers, the foundation of six others were shattered and the boilers thrown from their seats; this threw the pit completely idle until the 1st of March, when the boilers were all repaired and the foundations completed; work was again resumed and has continued briskly since. Two new Monarch boilers, made by Robb & Co., Amherst, have been put up: each boiler is 150 horse power with smoke stacks 86 feet high; these drive the 8 foot Murphy Fan and also the pumps in the pit.

A dressing house for the miners has been built. The west slope low lift levels have been extended west 300 feet and a balance driven up and 16 rooms won out. The levels on the east side have also been extended about 650 feet. The levels on the 1200 feet lift east slope has been driven 8 feet balances and rooms opened up.

A section of long wall work has been carried during the last six months; the face is about 350 feet long and is driven direct up hill on the plane of the coal. The pillars in No. 5 and No. 6 balances have been all, I may say, successfully drawn this season. A travelling road on the east side of the east slope is about completed. The ventilation is good.

#### SYDNEY MINES.

Work has been brisk at this mine during the year. On the south side of the pit in the new angle deep, levels and deeps have been extended and a fine section of coal opened up there; also, south of that in No. 2 angle the extension of the works have been carried on and looks well. On the north side of the pit the dip workings have also been extended in the different sections and all in good order. The timbering and ventilation is satisfactory. Throughout the whole the mine is in good condition.

#### NEW CAMPBELLTON MINES.

This property has been acquired by the Messrs. Burchell Brothers and operations commenced last spring. A fine new wharf is being built and is about complete at this date. The old railroad bed has been reconstructed and laid from wharf to pit with steel rails. A new engine house and blacksmith shop have been built, a fine hoisting engine with drum and ropes has been erected, and is in good working order. Six blocks of miners' cottages have been repaired and put in order.

The old slope has been cleaned out and retimbered. A good Cameron pump is placed in the pit: the water is being pumped out day and night, and it is expected that the pit will be dry by the

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middle of October. Mr. Burchell, the manager, informs me that it is his intention to drive to the dip of the present workings and gain a new lift, as the coal seems to improve in quality as it goes to the dip.

#### CAPE MABOU COAL MINES

I visited on the 30th of August last and found about 20 men employed there, some building a breakwater and others driving a tunnel through broken strata, in order to catch the face of the level. It appears that as the bords last season were extended up hill towards the top of the cliff and crop of the seam, where the roof got thin, some holes fell in, and during last winter some snow and frost got in through these holes. In the month of June it began to thaw and a large body of it came away, breaking the timber as it went down hill. This brought the weight on the level and low workings, closing it in towards the mouth of the level, 17 boards were lost with about 500 tons of coal, which was in them at the time.

The tunnel that is being driven is for the purpose of catching the solid coal at the face of the level, and also to come out on the old level to the face of those boards.

A breakwater 320 feet long and a wharf 240 feet long is built. Charles L. Snow, the resident manager, says that it is his intention to build two more blocks, which will give 18 feet of water at the loading ground.

## ACCIDENTS IN CAPE BRETON MINES IN THE FISCAL YEAR ENDING SEPT. 30TH, 1893.

DATE.	MINE.	NAME OF PERSON.	OCCUPATION.	AGE.	REMARKS.
April 11...	Gowrie .....	Murd. McKinnon.	Driver .....	19	Killed by fall of stone from roof.
" 20...	Victoria .....	Rod. McIntyre...	" .....	15	Collar bone broke by piece of roof coal falling.
" 22...	Sydney .....	Rod. McDonald..	Miner .....	70	Leg broke by piece of coal from roof fan of room.
May 20 ..	" .....	John Handely...	Trip-runner..	18	Leg broke trying to get on trip in motion.
June 7 ....	" .....	John Boutilier..	Road-man ..	22	Killed by damp that escaped from submerged district.
" 11 ....	Gowrie .....	Alex. Young ....	Miner .....	40	Injured on spine; fall of roof coal; died six weeks after.
July 15 ..	Caledonia...	Eugene Burnoe..	" .....	38	Burned by powder while filling skips from can in pit.
" 22...	Gowrie .....	Angus Holm .....	" .....	39	Slightly hurt on back by splint coal from roof.
Aug. 17...	Reserve .....	Murd. McDonald..	" .....	40	Hip dislocated; lumps of coal rolled over on him.
Sept. 4....	Victoria .....	Mich. Cameron ..	" .....	50	Hurt on back by piece of coal from roof in pillar work.
" 5....	" .....	Joseph McIntyre..	Cage-runner..	20	Run over by cage in balance; died next day.
" 7....	" .....	Philip Casey .....	Shift-man ..	27	Three ribs broke; piece of coal from roof at face of long wall.
" 22...	International	John McRitchie..	Miner .....	58	Hip dislocated; fall of roof coal at face of room.

P. N.



Cubic feet of Air Circulating through C. B. Pits in 1893.

MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	Aug.	Sept.
Gardner .....	15,000	21,000	25,000	28,270	18,000	20,000	19,800	19,450	20,000
Victoria .....	30,000	42,120	40,000	62,200	74,200	69,840	67,340	68,500	53,200
Sydney .....	70,000	75,360	71,420	75,405	77,470	74,175	70,465	71,860	73,370
Reserve .....	40,000	45,000	33,740	40,000	41,000	33,750	52,070	51,560	54,000
Emery.....	23,000	17,000	21,000	21,000	15,000	14,900	22,640	26,120	22,440
Caledonia .....	39,000	41,270	40,000	41,110	38,960	46,963	47,000	48,376	48,500
Gowrie .....	38,640	35,990	39,000	38,650	40,000	35,510	40,000	39,642	35,220
Little Glace Bay .....	.....	.....	39,000	39,102	33,200	34,830	45,000	30,000	29,800
International.....	.....	.....	21,600	.....	71,700	59,440	82,400	57,700	65,000
Old Bridgeport .....	.....	.....	25,000	23,485	25,000	23,500	25,800	22,840	23,960
New Campbellton .....	.....	.....	.....	.....	.....	.....	.....	.....	8,000
Cape Mabou .....	.....	.....	.....	.....	.....	.....	.....	.....	10,000
Lingan .....	.....	.....	.....	.....	.....	.....	.....	.....	3,110

P. N.

VISITS TO CAPE BRETON MINES IN YEAR 1893.

MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	Aug.	Sept.
Gardner .....	4	2	16	8	19	21	18	16	14
" .....	.....	.....	.....	11	.....	.....	.....	.....	.....
Victoria .....	17	24	11	21	24	27	20	12	5
" .....	.....	.....	20	.....	.....	.....	.....	.....	7
" .....	.....	.....	.....	.....	.....	.....	.....	.....	11
Sydney .....	21	22	8	26	23	9	11	8	12
" .....	.....	.....	.....	.....	.....	15	.....	.....	.....
Reserve .....	23	1	10	10	10	10	7	3	15
Emery .....	25	3	15	7	4	12	13	14	13
Caledonia .....	27	8	6	4	2	13	4	2	11
" .....	.....	.....	.....	12	.....	.....	.....	.....	.....
Gowrie .....	28	6	24	17	13	17	24	1	23
Little Glace Bay .....	.....	.....	18	15	12	16	6	4	9
" .....	.....	.....	.....	.....	.....	19	.....	.....	.....
Old Bridgeport .....	.....	.....	22	28	8	20	14	9	16
International .....	.....	.....	23	.....	6	23	8	18	9
New Campbellton .....	.....	.....	.....	.....	.....	.....	.....	23	.....
Cape Mabou .....	.....	.....	.....	.....	.....	.....	.....	30	.....
Lingan .....	.....	.....	.....	.....	.....	.....	.....	.....	4

P. NEVILLE, Deputy Inspector.

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**COAL—MISCELLANEOUS.**

In Victoria County the Messrs. Burchell purchased the Campbellton mine—which had been closed for a number of years—from Mr. Kenny, M. P., and are engaged in re-opening it in preparation for next season's work. The coal is reported as improving very much in quality, as it is opened beyond the old workings.

In the County of Inverness much interest was aroused in coal in the spring, and a large number of licenses applied for at Broad Cove, Chimney Corner and Port Hood. Little work has, however, been performed. Some borings are being made at Broad Cove, but up to date of writing the department is not advised as to their success. The Boston and Nova Scotia Coal Company have surveyed a route from Orangedale, on the Cape Breton Railroad to Broad Cove, and have acquired some areas at that point. It is understood that they contemplate the immediate building of the road and a development of a coal mine at Broad Cove.

At Mabou the Mabou Coal and Gypsum Company have continued working and developing during the season.

At the Coal Mine Cove, two and a half miles east of Mabou Harbor, an extension of 260 feet has been made to the coal wharf, and a double track laid to the mine. A breakwater wharf 320 feet long has been built, to which the Dominion Government are adding an extension 160 feet long. In fair weather both these wharves can be used for shipping coal.

The seams standing at a nearly vertical slope are entered by tunnels in the face of the cliff at water level by slopes driven every 25 feet along the level, &c. In the seven feet six inch seam there are 2,100 feet of levels and 1,750 feet of slopes. In the thirteen feet seam, opened in August, there are 546 feet of levels and 46 feet of slopes.

This property embraces an area of  $2\frac{1}{2}$  square miles, in which, according to Professor Hynd, there are 4,000,000 tons above water level, and 12,000,000 below.

In Richmond County some prospecting has been done by the Eastern Development Company on areas owned by them at Little River, but the results have not yet been communicated to the department.

## GOLD.

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The returns show 14,030 ounces up to the end of September, as compared with 21,080 ounces for the twelve months ended December 31st, 1892. This would indicate another falling off in the gold yield.

The business offers little of interest to be reported on during the past year. A few surveys were made in the Sherbrooke and Isaac's Harbor districts.

The following general statement shows the yield of each district.

GOLD—GENERAL STATEMENT FOR YEAR 1893.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.		Total Yield of Gold.	
					Oz.	Dwts.	Oz.	Dwts.
								Grs.
Tangier and Mooselands }	1	1481	1	1183		6	399	12
Oldham .....	2	17843	2	2389	1	6	3171	9
Caribou and Moose River }	3	13157	4	4701		7	1549	15
Stormont .....	2	18385	3	7570		9	3451	19
Salmon River .....	1	6817	1	3220		5	882	..
Montagu .....	2	526	2	740		13	511	11
Lake Catcha.....	3	4078	2	1361		10	734	10
Fifteen Mile Stream .....	1	2302	1	788		8	350	17
Uniacke.....	2	10589	2	644	1	8	905	11
Waverley .....	2	13611	1	5509		5	1529	6
Whitebun .....	2	2364	1	649		13	448	11
Unproclaimed and other Districts. }	5	14356	4	1487		10	788	8
	26	97471	....	28040	.....		14030	5
								7

The mines were visited by Deputy Inspector Maddin last summer, and the following notes will serve to show the condition of matters at the principal points visited :—

*The Crow's Nest Mine*.—On July 24th I found Mr. Craigie in charge. Nothing of sufficient importance to relate has been done here since last year.

*Cochran Hill Mine*.—On July 24th I visited this mine, and found A. H. McQuarrie, lately of Montague mine, and Duncan Rankin, with four men prospecting. Some trenching has been done and several gold bearing leads were exposed. Later in the summer a trial crushing was made.

Country Harbor Gold Mines were visited by me. On July 25th I found O. B. Brown manager, J. G. Mason, underground manager, thirty-five men employed; depth of shaft 109 feet, a twenty stamp mill.

*Copeland Mine*.—On July 25th, J. C. McDonald, manager; J. Mason, underground manager; thirty-one men employed; depth of shaft 130 feet, 15 stamp mill. This mine is in satisfactory order and condition.

*North Star Mine, Isaac's Harbor*.—On July 26th, R. McLeod, manager; W. Walsh, underground manager; thirty men employed; depth of old mine 500 feet; two new leads have been exposed by inclines, one of 80 feet and the other of 50 feet depth. On account of the disturbed condition of the bed rock the leads here are irregular, making it a somewhat difficult task to ventilate the mine, however, as careful attention is bestowed on timbering and keeping the air ways clear, this, with the assistance of a fan 39 inches in diameter, blades 10 by 24 inches, run by the mill engine at a velocity of from 200 to 350 revolutions per minute, keeps the ventilation satisfactory.

*The Richardson Gold Mine*.—Visited on July 26th, C. F. Andrews, manager; J. Clark, underground manager; 28 men employed; 20 stamp mill, shaft down 90 feet, and still sinking at the date of my visit. This mine is about  $1\frac{1}{2}$  miles from the main post road on the northern side of Isaac's Harbor. On the same side of the harbor, under the management of S. Giffins, an old mine is being opened up, new machinery is being erected, and energetic preparations being made for active work.

*Goldenville*.—At this mine at the date of visit, with the exception of prospecting, very little was being done.

*Ecum Secum*.—This mine is idle, but at date of visit indications seemed to point to an early resumption of work.

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*Dufferin Mine.*—On July 29th, A. K. Archibald, manager; R. Irving, underground manager, and 40 men employed. A shaft is being sunk to strike the 12 ft. lead lying south, and also an opening out on the 5 ft. lead lying north of the old south lead. The shaft was down 300 feet at the time of my visit, and still continuing to sink. The mine is in good condition.

*Oxford Gold Mining Co., Chezzetcook.*—On August 2nd, J. M. Reid, manager; D. M. Thompson, underground manager; 20 men employed. The principal work done here has been on the Colman lead; a considerable amount of surface has also been crushed with good results.

*The Anderson Mine.*—On August 2nd, J. H. Anderson, manager; Wm. Dukespire, underground manager, and 8 men employed, working in a lead, which looks very well, west of the old works, 3 shafts down forty feet. Things look well in this district.

*Montague Mine.*—On August 3rd, R. Thomas, manager; William Collins, underground manager; 36 men employed. Depth of shaft 265 feet and still sinking. The travelling way in this mine is the best I have seen in any of our gold districts. A considerable amount of building and remodelling of buildings and machinery has been done here.

*Salisbury Gold Mining Co.*—On August 3rd, P. T. Pride, manager; S. Haskins, underground manager; 18 men employed; depth of shaft 65 feet, 5 stamp mill. As this mine was being opened at the date of visit on an old shaft, it looked somewhat rough, yet it was safe, and as they are still working down on the lead it is only a question of a short time when the superfluous waters of the old workings will be drained, and the mine present a better appearance,

*The Simonds Kaye Mine.*—H. Lawson, manager; 11 men employed; depth of shaft 90 feet, and still working down on the lead. A new mill house and 10 stamp mill have been erected, as also a large trestle from the pit head to mill house. Expenses here, as well as at the Montague mine, have been large. The machinery is new and well adapted for the duties required. The work is conducted very efficiently.

*West Waverly Gold Mines.*—H. F. Putner, manager; 60 men employed; depth of shaft 230 feet. A tunnel was driven north 125 feet and south 256 feet, cross-cutting 6 leads and stoped 300 feet east on the Dominion lead, and west 175 feet on same lead. The Tudor lead is stoped 86 feet east, and 144 feet west; 10 more stamps have been added to the mill, making it now a 20 stamp mill. A new magazine and shaft house have been built. This mine is managed very efficiently, and the work conducted in a satisfactory manner.

*East Waverley Mines.*—Mr. B. C. Wilson, Manager. At this mine a large amount of preliminary work has been done.

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The tunnel is in 625 feet to the Barrel lode, and an upraise has been made at the face to the surface 300 feet, and levels have been driven about 500 feet on each dip of the vein. About 250 tons have been broken down and about 1000 tons are standing. Arrangements have been completed for plant, compressor, etc.

*Oldham.*—On August 4th, J. E. Hardman, agent, W. J. McIntosh, manager; 50 men employed. The shaft or incline is down 475 feet. Compressed air is used for drilling purposes. They have stoped on the lead 900 feet east and 800 feet west. A shaft is being sunk on the Napier lead; it is now down 134 feet. Several leads were exposed by crosscuts driven 150 feet north and 50 feet south. The Blackie lead has been opened up 140 feet east and west, and the No. 6 lead is opened up on the north dip 40 ft. and south 25 feet, and of the No. 5 lead and the Harrison lead 100 feet are opened up. A perpendicular shaft well timbered cuts these leads. All this work is carefully and systematically conducted.

*The Caledonia Mining Co.*—H. S. Stevens, manager; 15 men employed; depth of shaft 100 feet; 10 stamp mill; were driving a tunnel north at date of visit, and had then gone 125 feet, cutting three leads.

*The Rhode Island Mining Co.*—N. Logan, manager; George F. McLaren, underground manager; 6 men employed; depth of shaft 260 feet, and working on the Dumbrack lead. In my opinion this mine is well timbered and ventilation good.

*Moose River Gold Mine.*—On August 5th, D. Touquay, manager, Thomas Reynolds, underground manager; 20 men employed; worked last fall and winter on the copper lead and Taylor lead. A large area of the slate belt overlying the lode was crushed; some of the small quartz leads in this slate belt are very rich and the returns from this proved quite satisfactory.

*The Montreal Company.*—A. McGregor, agent; 22 men working on contract; the workings of this mine appear safe.

*Caribou District, Truro Mining Co.*—G. W. Stuart, manager; Wm Woodworth, underground manager; 16 men employed sinking on the west or mill shaft with the design of cutting the rich strike in the east shaft, worked last year. A crosscut is also being driven at the eastern end of the tunnel at a depth of a hundred feet. All the work is done by contract excepting the operations in the east shaft.

W. H. Saunders is now engaged opening the old Lake Lead Mine taking the water out and retimbering.

R. Wright has 4 men employed on the old Caffrey property.

E. C. McDonald and H. H. Anderson are sinking a perpendicular shaft in the saddle and expect to cut a lead in 10 or 12 feet more.



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*The Dixon Mine.*—H. Dixon, manager; Patrick Caffee, underground manager; 20 men employed; shaft down 180 feet. They have opened up 350 feet of the lead and are preparing to crosscut east and west, and anticipate cutting another lead. The mine is well and efficiently managed. The road to the mine is about the best I have seen in the county and is deserving of praise.

*Fifteen Mile Stream.*—On August 9; James A. Fraser, manager. This mine is well equipped with suitable machinery; hoisting engine is a duplex, high and low pressure, the diameter of high pressure cylinder 7 inches and of low pressure 14 inches. The mill engine is similar to hoisting engine. They have also a compressor capable of driving 6 drills, 15 stamp mill; 24 men employed; depth of shaft now working 90 feet; tunnel driven south 143 feet cutting two leads.

A considerable amount of prospecting is being done east of the Egerton on the M. G. McLeod areas, also to the west, on the Sutherland areas.

Mining matters look very satisfactory in this district, but the roads to it are very bad.

*Queen's County Gold Mines—North Brookfield District.*—Sept. 13th. For some time past this district has been idle, but in September A. H. Harding, began to make some improvements on the machinery and at date of visit was nearly ready to begin operations.

*Malaga District.*—Sept. 14th. I found all idle here except the Boston Gold Mining Company. F. K. Ballow, manager; Charles A. Prest, underground manager; 25 men employed; two shafts, one down 30 feet, and the other 40 feet. There is here also a good air compressor and crusher; also a good 10 stamp mill.

There are two men, F. B. Murchy and one McPhail, prospecting on the Parker Douglas property. This is all the work at present going on here, although 4 or 5 fine properties well equipped are standing idle.

*Whiteburn District.*—Sept. 15. Crocker Mining Company, Kendall F. Crocker, manager, and A. McMillan, underground manager; 25 men employed; depth of deepest shaft, 180 feet; there are in all 5 shafts ranging from 40 ft. to 180 feet deep, almost ready for work. The mine appears to be in good condition. Extensive repairs have been made by the present management, with the result that the work now looks safe and good. A 10 stamp mill is now here.

Alex. Gordon has 8 men trenching in what is called the Whiteburn Mining Co's. property, and has cut a large number of leads; there are, however, 3 or 4 that look well at the surface.

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This is all that is at present being done here, although several fine properties, well equipped, some of which are almost new, are standing idle.

*West Caledonia.*—This is a new mining district lately discovered lying some 4 or 5 miles west of Whitburn Mines. Some 4 or 5 leads have been cut shewing gold. The principal owner, Michael McGinty, lives near, and would prefer to sell to practical men who would be able to work it successfully. I may remark here that at this point as well as at many other places in the western counties there appears to be every probability of the existence of gold-bearing lodes quite as rich as any known east of Halifax.

I regret to say that in this county gold mining is not so actively prosecuted as hitherto, although some of the best equipped mines in the province are standing idle with very little work done to develop the properties, so little in some instances that it is practically undeveloped to any extent.

I am pleased to state, however, there are tangible signs of improvement in this industry. No accidents of any consequence have occurred during the past nine months in gold mining.

I would like just here to say that in this country wherever gold mining has been prosecuted, a very large amount of labor, time and money has been spent in prospecting and working our gold fields, the extent of which can not be seen anywhere, nor the result of their labors shown. In my opinion this is a serious misfortune as if accurate plans, surveys, and records of such work was filed in some place available to the mining capitalist, it would eventually save a large amount of loss and be a source of information that would be profitable hereafter.

I have the honor to remain your very obedient servant,

WILLIAM MADDIN, JR.,  
*Dep. Inspector of Mines.*

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### SCHOOLS OF INSTRUCTION.

At the date of writing the following instructors are engaged in preparing candidates for examination for certificates of competency as underground managers and overmen :—

A. D. Ferguson . . . . .	Springhill.
Benj. Smith . . . . .	Joggins.
Jno. Johnson . . . . .	Westville.
Alex. McDonald . . . . .	Stellarton.
J. W. Sutherland . . . . .	Thorburn.
Jno. Carey . . . . .	Sydney Mines.

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Peter Currie .....	Low Point.
Jno. Johnson .....	Bridgeport.
Geo. N. Greenwell .....	Glasgow.
Isaac Greenwell. ....	Reserve.
Neil F. McNeil .....	Glac Bay.
R. Anderson .....	Cow Bay.

The following is the list of the candidates receiving certificates of competency as enginemen at the examination held October 4, 1893 :

W. Pippy .....	Springhill .....	First Class.
J. W. Hall .....	" .....	"
J. B. Petrie .....	Low Point .....	Second Class.
Dan McKenzie .....	Glac Bay .....	"
Dan. McDougall .....	Glac Bay .....	"
Thos. I. Ling .....	Low Point .....	"
Wm. Merritt .....	" .....	"
Rory McPherson .....	" .....	"
Norman Henderson ....	Springhill .....	"
Wm. Hayman .....	Westville .....	"
Allan G. Campbell .....	" .....	"
Guthrie McElvie .....	" .....	"
Thos. Floyd .....	" .....	"
Jas. Saunders .....	" .....	"
Jno. Hetherington ....	Bridgeville .....	"
Chas. R. Slayter .....	" .....	Third Class.
Jno. R. Stamper .....	" .....	"
Chas. H. McAuley .....	" .....	"
Alex. F. McDonald ....	" .....	"
Elijah Langille .....	" .....	"
Archie McR. McDonald ..	" .....	"
Archie McDonald .....	Gardner .....	"
Thos. F. Strang .....	" .....	"
J. D. McKenzie .....	Westville .....	"
Geo. McDonald .....	" .....	"
Dan. Wilson .....	" .....	"
Jos. Reed .....	" .....	"
Jno. Hayman .....	" .....	"
Jno. R. McLeod .....	" .....	"
J. W. Cowan .....	" .....	"
Jas. Ford .....	Stellarton .....	"
G. R. Bain .....	" .....	"
Alex. P. Miller .....	" .....	"
Ed. Mitchell .....	" .....	"

## GYPSUM.

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The business has been conducted as usual, the shipments showing a slight gain. There are now four points from which Gypsum is exported from Cape Breton—Lennox Passage, Mabou, the Victoria Quarry near Baddeck, and Port Hood.

At Mabou Harbor during the past season the Mabou Gypsum Co. have built a wharf 270 feet long in addition to the shipping facilities already provided.

Work has been continued in the Windsor district and a branch railway laid into a new quarry at Newport.

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## IRON.

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During the past season operations have been continued steadily at Londonderry and Ferrona. The iron mine at Torbrook was worked steadily. Explorations at Londonderry showed fresh bodies of ore. In Pictou County the Charcoal Company secured a lease on a deposit of brown iron ore near the headwaters of Sutherland's River. Some explorations on the areas controlled by S. H. Holmes, Esq., showed that the favorable estimate of their value was correct, and a number of tons were extracted for the use of the Ferrona furnace.

The New Glasgow Iron and Coal Company continued working their mines at Bridgeville.

At Arisaig the McDonald leases were developed and several trial lots shipped to Ferrona. The ore is a red hematite of good quality, and is reported to exist in large quantities.

The following account of the Ferrona furnace is condensed from a paper by Walter Stein, read before the Mining Society of Nova Scotia :—

The clear lines of the furnace inside the brick work are : Height, 65 feet ; bosh diameter, 15 feet ; crucible diameter, 9 feet 6 inches. There are eight tuyeres and two cinder notches. The casting house is 50 by 153 feet, constructed of iron.

The furnace has two down-comers (gas flues) one carrying gas to the hot blast stories, the other leading to the boilers. There are three hot blast stoves, of the three pass Massick and Crook type, each stove being 16 feet 6 inches in diameter, inside of the shell, and

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60 feet in height. There is also a chimney on each stove 35 feet, high. Each stove is lined with 160,000 fire bricks. The blast is produced by two blowing engines, each weighing about 90 tons, having steam cylinders 36 inches in diameter, air cylinders 84 inches in diameter, and a 4 feet stroke. The engines are placed in a brick building designed for strength, and 35 by 60 feet.

Steam is generated in a battery of eight boilers, set in pairs, tubular, and designed to carry a pressure of 100 lbs. Each boiler is 6 feet in diameter, 20 feet long, and contains 52 tubes, each  $4\frac{1}{2}$  inches in diameter. The fuel used is waste gas from the furnace, the draft being produced by an iron chimney 125 feet high, and 7 feet 6 inches in diameter, and lined with fire-brick 4 inches in thickness.

The water supply is pumped from the East River into a stand pipe 10 feet in diameter and 80 feet high. There is a large ore, full, shed, hoist, scales, etc.

The coal washing plant is placed near the furnace and is the first erected in Nova Scotia. The coal is elevated, screened, and the large coal crushed. The resulting fine coal is separated into three sizes: nothing to one-eighth inch, one-eighth inch to one-quarter, one-quarter to three-eighths.

The coal is washed on two compartment feldspar jigs arranged with variable stroke. The washed coal is removed by elevation to a storage tower, and the refuse led to a convenient dumping-place. The water used is raised by a centrifugal pump and after performing its round of work returns again to the pump. The entire plant works automatically, requiring the services of three men.

The coal washed contains from 17 to 35 per cent. of ash, beside  $2\frac{1}{2}$  per cent. of sulphur. The washed coal contains on the average 10 per cent. of ash, or 1 per cent. more than the fixed ash, 9 per cent. of the coal. This is a remarkably good showing, and seldom surpassed. The fixed ash of course cannot be reduced. The sulphur is reduced by washing to 1.35 per cent., that being partially organic and partially fixed with lime or alumina. The total capacity of the plant is 300 tons of washed coal in ten hours. The average cost of washing, winter and summer, is put at  $7\frac{1}{2}$  cents.

The coke-making plant is situated close to the washer and contains 54 ovens of the Bernard pattern; further additions are contemplated. The coke is discharged from the oven every 40 to 48 hours by a steam ram. The charge for each oven is six gross tons of crushed and washed coke, containing 12 per cent. of moisture. The one-half of the ovens, discharged daily, gives from each oven  $4\frac{1}{2}$  tons of marketable coke, with less than 3 per cent. of moisture.

This exhibits a yield of 75 per cent. of good coke. The average cost of coke making per ton is 15 cents; this includes taking the

coal from the storage bin, charging, ramming, closing oven doors, sealing and watering. The work is performed by nine men, all ordinary laborers, except the man in charge of the ram engine. The coke is loaded on buggies by extra men and carried to the furnace by endless rope. These results must be considered as very satisfactory.

The success of this treatment of the Pictou coals shows what a good opening for coak making would exist in Cape Breton using washed slack. The Cape Breton coals without any preparatory attention make an excellent coke; by washing the ash and sulphur percentages would be materially reduced, and a coke made fully equal to that made at Connelsville.

The following (taken from the Mining Review) will serve to show the extent of the operations of the Pictou Charcoal Iron Company:—

The property comprises—

1st. About 5,000 acres of heavy old-growth hardwood land, besides the wood bought off an additional thousand acres of land in our vicinity.

2nd. Mining rights on Grant's farm, at the furnace, and about 400 acres of other land, only a few miles distant, not liable to any Government royalty; and the right of search for iron ores on five square miles of land at Springville, on five square miles at Sunny Brae, and on five square miles at Blanchard, on all of which places good ore is being found.

3rd. The limestone deposits on Grant's and McDonald's farms at Bridgeville and McLean's at Springville.

4th. The furnace grounds at Bridgeville, consisting of  $11\frac{1}{2}$  acres of land on Grant's farm, where the plant now is being erected, while we have completed about half a mile of railway track connecting our works with the New Glasgow Iron, Coal and Railway Company's road (running from Eureka Junction on the Intercolonial up through the East River Valley.) From this track we have also graded road beds up to the stack house and coal sheds, through which buildings separate tracks will be laid.

As regards the buildings here we have our offices (28'x32', with a 9'x16' annex), which contains, besides the office rooms, a drawing and construction room and a chemical laboratory; our carpenter and blacksmith shops (25'x50'), and a stable and tool house. We have also now nearly completed the engine house (35'x70), the coal sheds, the stack house and the casting house, the former of which is 40'x70'x21' parts, with a capacity of 10,000 bushels of charcoal, and the latter 130'x52'x14' parts, with lantern 10'x4' running the whole length of casting house. The workshops and furnace buildings are covered, roof and sides, with corrugated iron, which has

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already arrived and will be put on in a few days. The hoist tower, which also will be covered with iron, is to be 70 feet high, with double elevators; and the boiler house (20'x32') will have iron frame and iron roofing.

The working plant proper is of the following description :—

The furnace stack, 50 feet high and 11 feet bosh, with crinoline strapping and red brick "shell," supported by six iron columns, and having a wrought iron mantle and water cooling jacket and six braze tuyer and water blocks; the tap provided with a Weimer friction winch and gas-seal; the down corners 36" clear; bustle and blow pipe 15" diameter, with butterfly valve.

The slat blast, a Cooper "Durham" cast iron stove, with 30 V-pipes, 14'x18", cut in two and reversed, being arranged in two divisions, placed side by side and provided with combustion chambers, one at the inlet of the cold blast and the other where the now heated blast leaves the stove. This arrangement, made by the writer at the Katahdin Iron Works, Me., (from where this hot blast is now being moved to this place), proved there to be of great economic value, as the temperature of the blast can easily be maintained at a high degree (800° to 900° F.) with a very small amount of fuel (gas).

The boilers are four in number (30'x36') made of best Dalziel's 5/16" steel plate, and will be built in sets of two, with separate iron draft stacks and independent steam and water connections, so as to be worked separately if desired, each set being sufficient to operate the entire plant. The fuel for the boilers as well as for the hot blast will, of course, be the waste gases from the blast furnace, and both of them are provided with gas burners of special design, with combustion chambers so arranged as to cause a quick ignition and complete combustion.

The blowing engine has two horizontal blowing cylinders of 5' diameter and 5' stroke, and are the same as have been in use at Katahdin.

The elevator machines, with two of Wood & Co.'s "safety cages," as well as the limestone breaker—a "Foster Crusher-Pulverizer"—will be run by belts from a special steam engine of about 5 h. p.

For the handling and weighing of the stock we use the Weimer patent charging steel barrows, and the Richle's furnace charging scales and pig metal scales.

The water supply has been provided for by building a 25' inch high dam on the millbrook (about 800' from the furnaces) and from where two 3" wooden pipes will be laid, besides which a good-sized reservior is made about 150' above the furnace level, to catch the spring water which comes out from the hills above the furnace site, and which will thus give us a pressure of about 65 lbs. at the furnace.



Provisions are also made for washing, roasting and screening the ore as it comes out from the tunnels on the Grant farm, a few hundred feet only from the furnace.

Three tunnels are at present driven here, all showing and yielding a fine quality of brown hematite, besides which the McLean limestone quarry at Springville (three miles distant) has been opened up and a couple of hundred tons of stone delivered to us for furnace use. We are also burning part of the stone quarried for mason work and find it to be of a superior (very strong) quality.

For the carbonization of the wood we have those here at the works being of the round type, with a capacity of 50 cords for kiln (equal to a 1,100 cords, or 450,000 bushels of charcoal per annum); and those to be built in the woods of smaller size and of the Plattsburg (conical) type. Most of our wood will be burnt in the woods, from where we will haul the charcoal instead of bringing all the wood to the works for carbonization, thus making a considerable saving in freight.

AT TORBROOK UNDER THE SUPERINTENDENCE OF MR. R. G. E.  
LECKIE.

The development work for the past year has been scarcely more than was absolutely necessary to obtain pit room.

The total length of vein now opened up by drifting being 1,350 feet. The deepest shaft is 200 feet in depth, the vein being 6 feet wide, clean ore, at the bottom. The vein averages  $5\frac{1}{2}$  feet in width, and has been worked out for a distance of 1000 feet along the strike, to an average depth of 100 feet.

The dip seems to grow slightly less the deeper the vein goes, varying from  $60^{\circ}$  to  $70^{\circ}$  at the greatest depth, whereas, at the surface, it ranged from  $80^{\circ}$  to  $90^{\circ}$ . In September, an iron skip with a capacity of 4000 lbs. was placed in one of the shafts, thus more than doubling the hoisting capabilities. 2 cars per hour can now be loaded from this shaft alone.

The average analysis of the ore for the year gives between 55 p.c. and 56 p.c. metallic iron.



## COPPER.

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There is little new to report in copper mining outside the work done by the Eastern Development Company at Coxheath. They report as follows:—

The unexpected change in general financial situation all over the world prevented this Company from carrying out plans for 1893. The main slope (No. 2) was unwatered in April and the following mining and development work done. On the 190 ft. level the vein was under-stoped for 71 ft in length, 10 ft. in width, and 12 ft. in depth, yielding about 600 tons of ore, averaging 10 p. c. copper, from which a ton was forwarded to Chicago and added to the Nova Scotia Exhibit at the World's Exposition. On the 250 ft. level the drifts were extended 45 ft. On the lower or 320 ft. level 86 ft. of continuous drifting was done, the vein yielding a very good grade of ore. Total amount of ore raised from Shaft No. 2, 1250 tons. The hoisting engine has been thoroughly overhauled and repaired. An additional No. 4 Blake steam pump purchased. The residence for the mining captain and staff completed.

Preparatory to building permanent works the Company has purchased 522 acres of land covering sites for mining operations, concentration mill and a reservoir for ample water supply for the mill.

At Watson's Point, on the North West Arm of Sydney Harbor, the Company has purchased the Grantmyer farm and a portion of the Watson farm, in all 325 acres, with a water front of 2300 ft. The main smelting works are designed to be built on the 20 acres lying between the Cameron road and the water front. The Inter-colonial Railroad runs through this property. Watson's Brook can furnish ample water supply and the rear land contains a large quantity of good timber. The location is connected both by rail and water with the coal fields of Cape Breton County.

Amount of work performed during the year is as follows:—

Skilled labor above ground .....	1,020 days.
"    underground .....	1,177 "
Unskilled labor above ground .....	910 "
"    underground .....	836 "
One horse team and man .....	413 "

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4,356 days.

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The following remarks on coal weighing may prove of interest :—

### MINE AND COLLIERY WEIGHING.

BY WALTER J. MAY.

At the present time when purchasers are strongly insisting on having 21 cwt. of coal net to the ton, it may not be out of place to point out several of the reasons why these weights do not reach the end of the journey, and although the matter appears a simple one, yet experience teaches that various causes arise to prevent the 21 cwt. ton even being loaded. As between vendor and purchaser the following notes apply to coal, and to a great extent will be worth consideration by both parties.

Wagons being the method or medium of transmission, it will be well to deal with them first. A new wagon is built, painted, and while in its dry, new condition is weighed, say, to quarters, and for a ten-ton wagon we get a tare of, say, 5 tons 17 cwt. 3 qr. Well, this is painted on both sides in a conspicuous position, and is sufficiently correct if the quarters exceed the fractional weight, as, for instance, if the actual weight be 5 tons 17 cwt. 2 qr. 17 lb. in the example taken, the first dry load put in should, if the weather is dry, come out the same weight. Suppose, however, that washed coal is taken fresh from the machine while surcharged with water, and allowing this to stand, say, twelve hours to drain, and then weighing, to give say 10 tons 10 cwt. net, we get our wagon tare largely increased by absorbed water—often 1 cwt.—and only a load of 10 tons 9 cwt. is actually sent off, part of this being water. Now send this loaded wagon on a trip occupying say seventy-two hours, and in this time at least another hundredweight of water will be lost, and the load will have been reduced to 10 tons 8 cwt. In further working, the wagon will gain weight by reason of increased absorption of moisture and by accumulation of coal dust, and in wet weather the tare will probably be close on 6 tons, fluctuations of one or two quarters being about the actual thing in practice with careful retaring. After a time, repairs become necessary, and unless the wagon is thoroughly done up, the marked tare remains unaltered, and if the loading is done by the original taring, then it is possible to have each load 3 cwt. short, while the impression is that correct weight is being put on. To be really accurate, empties should always be tared before loading, and the weigher's book should show both the marked and actual tares. Another source of trouble arises where ore and coal are carried in the same wagons and the following list of tarings of six wagons bringing engine slack, and taking back washed ore to a point on the return journey, will show how this works. Six months' working is shown, two journeys per month being run :—

Wagon Nos.....	716.....	48.....	39.....	616.....	451.....	160
	T. c. q.	T. c. q.	T. c. q.	T. c. q.	T. c. q.	T. c. q.
Marked tares...	4 16 2..5 1 1..4	19 3..5 5 0..5	2 3..4 17 1			
Correct tares :—						
June.....	4 17 3..5 2 1..5	0 1..5 5 3..5	3 1..4 18 1			
July.....	4 18 0..5 2 1..5	0 2..5 5 3..5	3 3..4 18 1			
".....	4 17 3..5 2 1..5	0 2..5 6 0..5	3 3..4 18 2			
August.....	4 18 1..5 1 3..5	1 1..5 6 0..5	4 0..4 18 1			
".....	4 17 3..5 2 0..5	1 2..5 6 1..5	3 3..4 18 2			
September....	4 18 1..5 2 3..5	1 3..5 6 2..5	3 2..4 18 3			
".....	4 18 2..5 3 0..5	2 1..5 6 2..5	4 0..4 18 3			
October.....	4 18 0..5 2 1..5	2 0..5 6 1..5	4 0..4 19 0			
".....	4 18 1..5 2 3..5	2 0..5 6 1..5	4 1..4 19 0			
November....	4 18 3..5 3 0..5	2 2..5 6 3..5	2 2..4 18 3			
".....	4 18 3..5 3 0..5	2 3..5 6 3..5	4 1..4 18 3			
December....	4 18 1..5 2 2..5	2 0..5 6 1..5	5 0..4 19 0			
".....	4 18 2..5 2 2..5	2 0..5 6 1..5	5 3..4 19 0			

These were average flat-bottomed coal wagons, about four years old, and the variations shown were caused by the moisture and dirt from wet ore chiefly ; but, of course, wet weather had something to do with the matter.

On one occasion, in connection with a mine where the writer had an interest, loud and continued complaints came from a firm of furnace owners to, whom ore was shipped, that the ore weighed out short, and the writer accompanied a freight of 421 tons to ascertain where the loss occurred. The method of working was as follows :—The ore was loaded into five-ton "side tip" wagons provided by the railway company, tipped into the vessels at the docks after being weighed by the railway servants, and was at the port of discharge unloaded in the usual way into waggons (which were carefully tared) and weighed. The bill of lading was in every case made out from the railway weights and was also taken as correct by the mines management, as the weighings came so closely at both places, that after allowing for a little loss of ore in shunting, there was practically no difference. Taking this particular freight which was sent down to the docks in eighty-two waggons, and of which nothing was lost in loading and unloading or *en route*, it was practically 20½ tons short when discharged, and as, if anything, there would be a gain in weight through a slight deck leakage, it was clearly the fault of the waggons, and these being put on the weigh-bridge empty, both at the mine and at the dock, showed an average weight of just under 5 cwt. each more than the marked tare. Needless to say, the tares were at once corrected by the railway company, and further complaints of shortness of weight prevented. Clearly at all mines and collieries, the wagons, and particularly those of private owners, should be weighed before filling, and correct tares being marked in the weigher's book, as well as the indicated tares. It is little trouble, and at the end of the year makes little or no difference to the actual weight of coal loaded, as heavy and light tares average the actual

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loading as a rule, but they do not "average" weights to purchasers. An example of averaging came under the writer's notice in a case where 1,200 tons of iron ore was sent out to a firm who insisted on having all wagons retared before loading. The result ended in the sellers being 2 cwt. to the good, using railway company's wagons, but some wagons were nearly 5 cwt. above the marked tares.

A source of loss with coal and ore, but particularly the former, lies in overloading. Thus, some 10-ton wagons will not hold more than 9 tons of some particular coal, but as near the proper weight as possible is put on, and in the shunting of the wagons part of this coal slips off, with a result that the waggons are short in weight. Wagons should never be too full, as loss from the cause stated and from petty pilfering is a thing which tells badly against the vendor, and often causes a large amount of friction between vendor and purchaser. Loss of weight from exposure is a point which the vendor cannot guard against, and the purchaser should not expect a stock heap which has been lying some three or four months to weigh what it did originally. Stocked coal is usually lighter, and in many cases more tender and friable than that fresh from the pit, hence there is more slack to be taken out, and thus a less tonnage of round coal as well as total bulk.

In every case more or less slack will be made in the wagons in transferring from colliery to point of discharge, some shaking out of the crevices of the wagons *en route*. Again, if the wagons each contain 10 tons 10 cwt. net weight on arrival, if honestly weighed into 2 cwt. sacks, 10½ tons will not be produced, for while the wagon load only has one turn of the beam in weighing—the weighbridge should not need more than 7 lb. at the outside to cause it to act—in weighing into sacks, 10½ tons will need 105 turns, and rarely is weighing done closer than 1 lb. to the sack, or, say, 1 cwt. on 10½ tons. In fact, it is quite too absurd of purchasers to expect the coal to weigh out 21 cwt. to the ton, as this cannot be done save by putting on extra weight at the colliery, and it may safely be taken that where 21 cwt. to the ton has to be delivered, as was advertised by some public authority at Romford, extra rates must be charged by the colliery people to make up for the additional cost. However, people have got hold of the 21 cwt. craze, and probably it will last for a time, as they cannot be persuaded that 21 cwt. loaded at the colliery to ensure weight at the other end, is not the same as 21 cwt. delivered to the purchaser, and it is unfair to expect it. Contracts should be made for 21 cwt. loaded at pit, and not delivered, but a stipulation should be made that sound wagons be used, especially where nuts or other small coals are concerned. With sound wagons having spring buffers, proper taring of empties, and fair speed in delivery, a good margin of the extra weight should be saleable, but with the old block buffers an excess of slack may be fairly expected with tender and friable coals, and in screening this is increased.

Coming to the weighbridge on which wagons are weighed, it is

well to point out that this should be on a level piece of road, and for this reason. When the engine is drawing the train over the bridge, if the bridge is in the hollow the tendency of the draught is to make the wagon lift, and then "light" weighing is the rule, while if the bridge is on top of a hill the tendency is to drag the wagon down, and "heavy" weighing is caused. Both are unfair, and at least four wagon lengths on each side the bridge should be level with it. Personally the writer has weighed a single wagon on a "hollow" bridge, and then had it placed in the centre of a train of wagons and then it weighed just over 1 cwt. less owing to the lift; but when the road was levelled no appreciable difference could be found whether wagons were weighed singly or after being coupled up. The bridge should be balanced each morning and the steelyard adjusted, because differences of temperature will make a considerable variation in weight, as the steelyard is longer in hot weather than in cold, and "light" and "heavy" weighing will certainly occur unless this balancing and adjustment is attended to. The weigher should be provided with a book in the following form, the reason for which will be obvious, and at the same time it gives at a glance the working of the wagons:—

Owner of wagon.	Wagon number.	Marked tare.	Correct tare.	Gross.	Net.	Date tared.	Date sent out.	
		T.cwt.qr.	T.cwt.qr.	T.cwt.qr.	T.cwt.qr.			
Smith & Jones..	11,375..	4 19 3..	5 1 1..	14 19 3..	9 18 2..	Dec. 1..	Dec. 3..	Smith & Jones, London
Ditto	11,376..	4 17 1..	4 19 0..	14 19 1..	10 0 1..	Do. ..	Do. ..	Do. do.
Ditto	11,377..	4 18 3..	5 0 1..	14 19 2..	9 19 1..	Do. ..	Do. ..	Do. do.
Robinson & Co..	91..	3 17 0..	3 15 0..	9 1 0..	5 6 0..	Dec. 2..	Dec. 4..	Robinson & Co., Liv'pool
Ditto	41..	4 11 0..	4 12 1..	14 13 3..	10 1 2..	Do. ..	Do. ..	Do. do.

The above shows all that is necessary on the weigher's part, the clerk who makes out the invoice giving the weight charged, and assuming 21 cwt. to the ton is the rule, wagon No. 11,375 would have 9 tons 8 cwt. chargeable instead of 9 tons 18 cwt. 2 qr., as shown by the weigher. Should any dispute arise, the whole history of any particular wagon can be traced, and should a mistake occur, little trouble will be caused in finding it out. The writer uses such a form of book for dealing with ore, and the trouble is very small indeed when once the system is fairly started. It is also a good plan to get the "gross" weights from the railway weigh-house to compare with the mines weighings as this will often point out errors which can be easily rectified, whereas "net" weights will not do so.

Possibly the preceding notes are very crude, and, in any case, incomplete, but so far as they go they indicate where to look for the causes of trouble and disputes, which usually are unremediable. In regard to weighing as between master and man, in most cases special rules and methods of calculating prices will always exist, and these will render necessary the preparation of some special return applicable to the case in hand, but, speaking in a general way, the stricter the weighing the more satisfied the men, and *vice versa*.

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### IRON ORE TO SEPT. 30, 1893.

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	Tons.
Pictou Charcoal Iron Co .....	4,059
N. G. S. C. & Ry. Co.....	25,960
* " .....	1,591
Londonderry—	
East Mines.....	1,040
West Mines .....	14,177
†Torbrook .....	20,000
Total.....	66,837

\* From Crown Mines.

† Purchased by Londonderry Iron Co.

---

### BUILDING STONE, Etc.

---

Amherst, 1193 tons .....	\$6,265 value.
" Grindstones .....	6,971 "
Halifax, stone, etc. ....	260 "

---

### GYPSUM.

---

	Tons.	Value.
Arichat .....	5,025	\$ 5,025
Port Hood .....	1,542	1,156
Mabou .....	11,700	11,000
* " .....	27,000	.....
Baddeck.....	13,706	13,706
Parrsboro' .....	650	650
Windsor.....	62,901	62,901
Cheverie .....	9,868	6,634
Walton .....	4,555	4,437
Total.....	98,247	\$95,509

\*Bags.

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### MANGANESE.

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	Tons.	Value.
Walton .....	40	\$ 4,000
Halifax .....	62	6,533

---

### LIMESTONE TO SEPT. 30, 1893.

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Londonderry .....	Tons, 8964, value	
Arichat.....	Bbls., 2050, "	\$2050
Ferrona .....	Tons, 9670.	

## STATEMENT—LONDONDERRY,

*Shewing number of men and days worked at West Mines 9 months ending 30th Sept., 1893.*

1893.	ABOVE GROUND.				UNDERGROUND.					
	Skilled.		Unskilled.		Skilled.		Unskilled.			
Month.	No. of Men.	Days worked.	No. of Men.	Days worked.	No. of Men.	Days worked.	No. of Men.	Days worked.	Ore Mine.	
									T.	c. q.
January.	5	87	6	143	40	734	42	661	1821	10 0
February	4	62	6	140	33	624	39	465	1942	12 0
March ..	1	25	7	179	31	731	22	426	1945	9 0
April ...	.....	.....	7	120	22	336	20	206	840	16 0
May ...	.....	.....	10	193	25	591	19	335	1580	13 0
June ...	.....	.....	10	209	25	601	24	415	1428	5 0
July ...	3	56	9	191	25	568	34	616	1851	8 0
August .	2	33	9	163	22	395	25	420	1156	9 0
Sept.....	2	52	8	202	22	559	27	586	1610	8 0
Total ..	17	315	82	1540	245	5139	252	4130	14177	10 0

## STATEMENT—LONDONDERRY.

*Number of men and days worked at East Mines for nine months ending  
30th Sept., 1893.*

1893.	ABOVE GROUND.				UNDERGROUND.				ORE MINED.		
Month.	Skilled.		Unskilled.		Skilled.		Unskilled.				
	No. of Men.	Days.	No. of Men.	Days.	No. of Men.	Days.	No. of Men.	Days.			
January .....	1	26	4	71	4	50	5	101	t.	c.	q.
February .....	1	24	4	70	4	78	6	75	274	17	0
March .....	1	26	2	38	2	36	5	54	157	12	0
April .....	1	26	4	56	2	26	2	28	73	18	0
May .....	1	26	4	45	2	24	2	24	78	5	0
June .....	1	26	4	41	2	43	3	59	81	9	0
July .....	1	26	4	28	2	24	3	26	158	8	0
August .....	1	26	4	43	1	24	2	31	75	10	0
September .....	1	26	2	43	1	24	2	31	53	0	0
									87	9	0
									1040	8	0

## LIME QUARRY.

January .....	2	52	12	240	.....	.....	.....	.....	938	9	0
February .....	2	48	12	216	.....	.....	.....	.....	777	3	0
March .....	2	52	13	260	.....	.....	.....	.....	1261	12	0
April .....	2	52	12	240	.....	.....	.....	.....	919	9	0
May .....	2	52	12	245	.....	.....	.....	.....	1143	0	0
June .....	2	52	13	260	.....	.....	.....	.....	1010	9	0
July .....	2	52	12	236	.....	.....	.....	.....	885	8	0
August .....	2	52	9	161	.....	.....	.....	.....	698	11	0
September .....	2	52	16	288	.....	.....	.....	.....	1329	14	0
									8964	15	0



**REPORT OF TORBROOK IRON MINES, YEAR ENDING  
SEPT. 30TH, 1893.**

Month.	Output Tons.	Men employed.	No. of Shafts working.	Remarks.
<b>1892.</b>				
October .....	2249	101	4	
November .....	2832	102	4	
December .....	3378	101	4	
<b>1893.</b>				
January .....	3291	102	4	
February .....	3011	100	4	
March .....	3446	104	4	
April .....	1399	70	3	} Sinking Shaft.
May .....	1404	69	2	
June .....	1657	68	2	
July .....	2209	63	1	
August .....	2458	72	2	
September .....	2505	75	2	
	<u>29839</u>			

1797 cars were loaded at the mine during the year,—total shipment amounting to about 30,000 tons.

Average number of men employed, 86.

Average number of shafts working, 3.

PICTOU CHARCOAL IRON CO., LIMITED.

Total number of gross tons (2,240 lbs.) of ore mined and used in the Co.'s furnace up to Jan. 1st, 1893..	415	
Total number of tons (2,240 lbs.) pig iron made.....		189
“ “ “ “ .....		445
Ditto in February and March.....	853	
Ditto mined and shipped in July and August.....	1279	
“ “ “ August and September..	1512	
Total number of long tons of ore.....	4059	
Total tons pig iron.....		634
Equal to 4,546 short tons (of 2,000 lbs.) ore mined, and equal to 710 short tons (of 2,000 lbs.) pig iron made.		

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**CUSTOMS, CANADA.**

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Statement of articles, the produce of the mine, exported from the Port of Halifax to other countries, for nine months ending 30th September, 1893 :—

**THE PRODUCE OF CANADA.**

	Tons.	
Coal .....	32,280	\$107,596
Gold in bars .....		176,082
Manganese .....	62	6,533
Gold bearing quartz .....		105
Copper ore .....	24	100
Other articles (stone, &c.) .....		260

The above figures are only for articles the produce of Canada.

I have the honor to remain, sir,

Yours obediently,

E. GILPIN, JR.

## LIST OF MINERAL LEASES (OTHER THAN GOLD.)

## IRON.

No. of LEASE.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	No. of Sq. Miles.
84 .....	Prothero, P. ....	Cape Breton..	.....	.....	1
86, 93 .....	Moseley, E. T. ....	"	.....	.....	2
.....	McLean, Jno. ....	"	.....	.....	1
91 .....	Brookman, Phoebe .....	"	.....	.....	1
92 .....	Matheson, D. ....	"	.....	.....	1
102 .....	Smith, W. ....	"	.....	.....	1
103 .....	McKenzie, H. R. ....	"	.....	.....	1
104 .....	McKenzie, J. W. ....	"	.....	.....	1
43, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59 .....	Bartlett, J. H. ....	Pictou .....	.....	.....	15
0, 0 .....	Pictou Charcoal Iron Co. ....	"	.....	.....	2
60, 68, 70, 0, 0 .....	New Glasgow Iron, Coal & R'y Co. ....	"	Grah'm Fraser	New Glasgow.	5
0, 0 .....	Holmes, S. H. ....	"	.....	.....	2
61, 67 .....	Cameron, Jno. A. ....	"	.....	.....	1
1 .....	McIntosh, J. C. ....	Hants .....	.....	.....	1
2 .....	McDonald, L. ....	Antigonish ..	.....	.....	1
0 .....	McAloney, Jno. ....	Cumberland ..	.....	.....	1
5 .....	McDougald, Jno. ....	Antigonish ..	.....	.....	1
10 .....	Fraser, W. J. ....	Inverness ..	.....	.....	1
16 .....	Inverness C., I., R'y Co. ....	"	.....	.....	1

1, 2	New Glasgow Iron, Coal & R'y Co.	Guysboro	2
0	G. A. Vye	Colchester	1
			43

COPPER.

145	Drummond R (& Iron)	Cape Breton	1
142	Le Cras, Henry	"	1
126	Matheson, A.	"	1
116	Greener, John	"	1
106, 95	Eastern Dev. Co	"	2
105	Burchell, J. E.	"	1
94	McKenzie, D.	"	1
2	Grant, J. A.	Antigonish	1
3	Gray, B. G.	"	1
4	McInnis, Hugh	"	1
12	Jones, A. C.	Inverness	1
7	Nichols, T.	Victoria	1
6	Hardman, J. E.	"	1
			14

LEAD.

143	Cape Breton Silver Mining Co.	Cape Breton	1
2, 3	Fraser, C. F.	Colchester	2
0	Kirk, R. B.	Guysboro	1
			4

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.

No. of Lease.	Name of Owner.	County.	Agent or Manager.	Address.	No. of Sq. Miles.
<sup>1</sup> / <sub>2</sub> , 3, 4, 62, 63, 64, 69 <sup>23</sup> / <sub>42</sub> , 5/12, 6/13, 9/14 8/6 10/24 11/11, 45, 10 66/46 .....	Acadia Coal Co..... Intercolonial Coal Mining Co..... New Glasgow Iron, Coal & R'y Co.. Richey, M. H..... Gray, B. G..... Fergie, C..... McNeil, W. P.....	Pictou..... "..... "..... "..... "..... "..... ".....	H. S. Poole.. C. Fergie.... ..... ..... ..... ..... .....	Stellarton .. Westville.... ..... ..... ..... ..... .....	18 3 1 1 4 1 1
.....	.....	.....	.....	.....	29
56, <sup>22</sup> / <sub>51</sub> , 74..... 55, <sup>16</sup> / <sub>6</sub> , <sup>17</sup> / <sub>7</sub> , <sup>18</sup> / <sub>8</sub> , <sup>19</sup> / <sub>44</sub> , <sup>20</sup> / <sub>53</sub> , <sup>21</sup> / <sub>50</sub> , 61, 62, 70, 71, 72, 73, 75, 76, 77, 78, 79, 81, 82, 83, 84, 85, 87, 88..... 0, 0..... 8/5..... 6/12..... 15..... 9/22, <sup>10</sup> / <sub>23</sub> , <sup>11</sup> / <sub>23</sub> , <sup>12</sup> / <sub>23</sub> , <sup>13</sup> / <sub>20</sub> ..... 23/53.....	Canada Coals & R'y Co .....  Cumberland R'y & Coal Co..... "..... Lawson Mining Co..... Londonderry Iron Co..... Prospect Mining Co..... Styles Mining Co..... Milner, C.....	Cumberland.  " " " " " " "	A. Dick.....  J. R. Cowans. ..... ..... ..... ..... ..... .....	Joggins .....  Springhill ... ..... ..... ..... ..... ..... .....	15  30 4 1 4 2 5 1

24/7, 25/9	Boston Coal Mining Co.	"	2
57	Salts Spring Coal Co.	"	1
26/16	Minudie Mining Co.	"	1
58, 59, 60, 61	Tupper, C. H.	"	4
63, 0, 0	Leckie, R. G.	"	3
65	Annand, C.	"	1
66, 67, 68, 69	Cowans, I R.	"	4
80	Gue, T. R.	"	1
86	Rutherford, John	"	1
0	Fraser, H. R.	"	1
89	Hickman, J. S.	"	1
0	Weatherbe, V. S.	"	1
0	Hayward, A. A.	"	1
			85
13/79, 1/27, 2, 3, 28, 29, 30	General Mining Assoc., ltd.	Cape Breton.	23
58/67	Weatherbe, R. L.	"	1
42/52, 49/53	McLeod, Hugh	"	2
45/5, 46/28, 47/29	Belloni, C.	"	3
50/40, 51/41, 52/42	Duffus, W., et al.	"	3
60/54, 61/55, 62/56, 63/57, 64/58, 65/59, 66/60, 67/61, 68/62, 69/63.	Sydney Coal Mining Co.	"	10
108, 109, 110	Ross, Wm.	"	3
111	Roberts, F.	"	1
		Carried forward	46

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.—Continued.

No. of Lease.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	No. of Sq. Miles.
112, 113, 114, 115, 117, 118.....	Cowans, R. ....	Cape Breton..	.....	Br't forward..	46
127, 130.....	Fairbanks, E. C. ....	"	.....	.....	6
128, 129, 134, 135, 136, 139, 144..	Moseley, E. T. ....	"	.....	.....	1
135.....	McKenzie, R. ....	"	.....	.....	7
138, 149.....	White, A. J. ....	"	.....	.....	1
140.....	McColl, J. ....	"	.....	.....	2
141.....	Cumberland R'y & Coal Co.....	"	.....	.....	1
146.....	Tremaine, B. E. ....	"	.....	.....	1
159, 160.....	Morrison, A. ....	"	.....	.....	2
0, 0.....	East Bay Coal Co. ....	"	.....	.....	2
0.....	Dunn, J. ....	"	.....	.....	1
161.....	Routledge, E. ....	"	.....	.....	1
164, 0, 0.....	Roberts, F. ....	"	.....	.....	3
0.....	McVey, Jas. ....	"	.....	.....	3
0.....	Routledge, W. ....	"	.....	.....	1
165.....	Stephens, L. H. ....	"	.....	.....	1
168.....	Hamilton, C. F. ....	"	.....	.....	1
0.....	Copeland, J. D. ....	"	.....	.....	1
162.....	Dominion Coal Co. ....	"	D. Mackean...	Glace Bay...	76



0	Murray, Jno.	"	1
0	Weatherbe, R. L.	"	1
			159
1/2	Kenny, T.	Victoria	3
1/13	McGregor, J. D.	Inverness	3
2/6	Ross, H. E.	"	1
3/11	Ross, W. J.	"	1
6/4,7/10	Shannon, S. L.	"	2
0, 0	Goreham, J. W.	"	2
8, 9	Fraser, W. J.	"	2
11	Meagher, N. H.	"	1
0, 0	Smith, J. J.	"	2
15	Chisholm, D.	"	1
0	McKenzie, J. W.	"	1
0	Drummond, R.	"	1
0	McNab, William	"	1
12, 13	Hussey, W. P.	"	2
1	Terminal City Co.	Richmond	1
2	Columbia Coal Co.	"	1
3	Reynolds, W. K.	"	1
0	Chisholm, Wm.	"	1
1	Ross, George	Colchester	1
			28

TABLE A.—COAL TRADE BY COUNTIES FOR THE YEAR ENDING SEPT. 30, 1893.

	CUMBERLAND.		PICTOR.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	146,519	133,256	108,287	85,913	150,967	26,784	.....	.....	405,773	245,953
2nd       "	129,900	116,905	134,794	122,292	315,302	286,254	470	418	580,466	525,869
3rd       "	127,063	103,240	131,964	130,958	437,302	479,724	145	180	696,474	714,102
Total.....	403,482	353,401	375,045	339,163	903,571	792,762	615	598	1,682,713	1,485,024
Year 1892 .....	458,493	422,647	449,725	405,457	1,032,864	923,869	1,698	961	1,942,780	1,752,934

TABLE B.—COAL TRADE BY COUNTIES FOR THE YEAR ENDING SEPT. 30TH, 1893.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
NOVA SCOTIA :																
Land Sales.....	33,244	56,976	1,839	95,263	84,142	.....	8,137	1,840	115	295	.....	.....	136,939	142,958	1,954	281,851
Sea borne .....	2,201	3,300	.....	32,389	2,619	.....	117,930	21,723	5,735	180	.....	.....	152,700	27,642	5,735	186,077
Total—Nova Scotia.....																
	35,445	60,276	1,839	127,652	86,761	.....	126,067	23,563	5,850	475	.....	.....	289,639	170,600	7,689	467,928
New Brunswick...	62,624	25,272	53,100	18,305	1,560	.....	23,578	9,124	1,893	123	.....	.....	104,630	35,956	54,993	195,579
P. E. Island .....	.....	.....	.....	11,273	18,537	.....	2,956	9,609	44	.....	.....	.....	14,229	28,146	44	42,419
Newfoundland .....	.....	.....	.....	543	.....	.....	41,433	1,321	544	.....	.....	.....	41,976	1,321	544	43,841
Quebec.....	25,536	9,264	72,241	69,200	5,299	.....	408,375	54,914	74,976	.....	.....	.....	503,111	69,477	147,217	719,805
West Indies.....	.....	.....	.....	.....	.....	.....	220	.....	.....	.....	.....	.....	220	.....	.....	220
United States .....	.....	7,804	.....	.....	.....	.....	5,767	2,528	.....	.....	.....	.....	5,767	10,332	.....	16,099
Other Countries...	.....	.....	.....	23	10	.....	.....	.....	.....	.....	.....	.....	23	10	.....	33
Total.....																
	123,605	102,616	127,180	226,996	112,167	.....	608,396	101,059	83,307	598	.....	.....	959,595	316,842	210,487	1,485,924

## COAL.—SALES.

*For year ending September 30, 1893.*

Names.	1st Quarter.	2nd Quarter.	3rd Quarter.	Total.	Year 1892.
Nova Scotia—					
Land Sales . . . .	100,786	96,965	84,100	281,851	349,128
Sea Borne . . . . .	24,155	64,156	97,766	186,077	274,580
Total N. S. . . . .	124,941	161,121	181,866	467,928	623,978
New Brunswick . .	56,997	64,514	74,068	195,579	214,550
P. E. Island . . . . .	.....	13,690	28,729	42,419	94,990
Newfoundland . . .	3,177	12,579	28,085	43,841	56,638
Quebec . . . . .	59,003	266,214	394,588	719,805	746,037
West Indies . . . . .	120	100	.....	220	2,849
United States . . . .	1,682	7,651	6,766	16,099	13,883
Other Countries . .	33	.....	.....	33	.....
Total . . . . .	245,953	525,869	714,102	1,485,924	1,752,934
1892 . . . . .	186,805	502,825	612,088	1,752,934	.....

## COAL.—GENERAL STATEMENT.

1893.	Produce.	Sold.	Colliery Consump- tion.
1st Quarter.....	405,773	245,953	45,382
2nd   "   .....	580,466	525,869	42,837
3rd   "   .....	696,474	714,102	54,872
Total.....	1,682,713	1,485,924	143,091
1892 .....	1,942,780	1,752,934	175,092

COAL PRODUCE OF NOVA SCOTIA FOR YEAR ENDING SEPT. 30, 1893.

COLLIERIES.	Produce.	SALES.			Total Sales.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
Chignecto .....	335	205	70	.....	275	.....	60
Joggins .....	70,138	54,958	9,248	.....	64,206	3,549	2,088
Springhill .....	333,009	68,442	93,298	127,180	288,920	23,716	20,367
Acadia .....	205,193	116,056	66,268	.....	182,324	16,534	4,137
Intercolonial .....	169,852	110,940	45,899	.....	156,839	7,955	2,293
Dominion .....	652,833	414,413	80,194	83,307	577,914	25,780	9,362
Sydney .....	175,374	131,855	16,058	.....	147,913	10,196	8,216
Victoria.....	75,365	62,128	4,807	.....	66,935	5,536	2,192
Mabou .....	615	598	.....	.....	598	71	39
Total .....	1,682,713	959,595	315,842	210,487	1,485,924	93,337	48,754

COLLIERY CONSTRUCTION ACCOUNT FOR THE NINE MONTHS ENDING SEPT. 30, 1893.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machinery.	Colliery Buildings.	Dwellings.	Surface Works.	Wharves.	Prospecting.	Railways.	Total.
Joggins.....\$	.....	1625	2340	6500	1050	3825	.....	950	.....	1300	17590
Springhill .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acadia .....	.....	.....	.....	1777	2339	.....	460	.....	2293	.....	6869
Intercolonial .....	.....	.....	76	5149	498	3067	1369	.....	.....	489	10648
Dominion .....	2295	.....	17257	191	.....	.....	356	.....	.....	.....	20099
Sydney .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Victoria .....	.....	.....	1860	400	.....	.....	.....	.....	.....	.....	2260
Mabou .....	.....	.....	1337	1150	.....	.....	1798	1300	.....	.....	5585
Total.....\$	2295	1625	22870	15167	3887	6892	3983	2250	2293	1789	63051

## MINES REPORT.

STATEMENT OF THE NUMBER AND CLASSES OF MEN EMPLOYED &c., &c., AT EACH MINE DURING  
THE NINE MONTHS ENDED SEPT. 30, 1893.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.				TOTAL.		Average No. of tons per Cutter.	Average tons raised per day per Cutter.	HORSES.		Days.
	Skilled Labor.	Laborers.	Boys.	Days Labor.	Skilled Labor.	Laborers.	Boys.	Days Labor.	Persons.	Days Labor.									
Chignecto . . . . .	2	2	120	1	75	7	1	12918	7	3516	5	195	5	167	2	5	1	10	60
Joggins . . . . .	125	48	40	47605	12918	39	1	52243	7	2025	266	64039	266	561	2	291	3	32	241
Springhill . . . . .	622	386	125	173516	52243	180	43	52306	118	1768	1474	225759	1474	535	3	2190	19	18	152
Acadia . . . . .	277	248	69	105226	52306	139	33	52306	72	2025	949	159617	949	740	3	152	19	18	195
Intercolonial . . . . .	217	71	76	68744	39	90	14	32549	3	1768	516	103061	516	782	3	793	9	9	214
Dominion . . . . .	851	165	205	200692	199	296	60	103121	14	2748	1797	306561	1797	767	4	4005	44	155	163
Sydney . . . . .	300	47	94	83946	63	98	41	43171	14	643	643	127117	643	584	2	863	8	52	203
Victoria . . . . .	97	89	19	40658	9	75	24	23768	14	313	313	64426	313	776	4	435	6	21	173
Mabou . . . . .	4	2	362	4	151	2	5	125	2	17	17	638	17	153	1	4	3	...	145
Total . . . . .	2495	1058	628	720869	512	917	216	320362	32	30	2	10182	5890	...	...	...	112	297	1546



## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1872	154,092	.75
1851	116,274	"	1873	264,760	"
1852	87,542	"	1874	138,336	"
1853	120,764	"	1875	89,746	"
1854	139,125	Free.	1876	71,634	"
1855	103,222	"	1877	118,216	"
1856	126,152	"	1878	88,495	"
1857	123,335	"	1879	51,641	"
1858	186,743	"	1880	123,423	"
1859	122,720	"	1881	113,728	"
1860	149,289	"	1882	99,302	"
1861	204,457	"	1883	102,755	"
1862	192,612	"	1884	64,515	"
1863	282,775	"	1885	34,483	"
1864	347,594	"	1886	66,003	"
1865	465,194	"	1887	73,892	"
1866	404,252	"	1888	30,198	"
1867	338,492	\$1 25	1889	29,986	"
1868	228,132	"	1890	50,854	"
1869	257,485	"	1891	25,431	"
1870	168,180	"	1892	13,883	"
1871	165,431	"	*1893	16,099	"

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

\* Nine months only.

*Nova Scotia Coal Sales, from 1785 to 1893 (Inclusive).*

Year.	Sales.	Total.	Year	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	160,674	
1790			1846	147,506	
1791	2,670	51,048	1847	201,650	1,533,796
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320		1851	153,499	
1796	5,249		1852	188,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775	1857	294,198		
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		
1804	5,976	1860	322,593		
1805	10,130	1861	326,429		
1806	4,938	1862	395,637		
1807	5,119	1863	429,351		
1808	6,616	1864	576,935		
1809	8,919	1865	635,586	4,927,339	
1810	8,609	1866	558,520		
1811	8,516	1867	471,185		
1812	9,570	1868	453,624		
1813	9,744	1869	511,795		
1814	9,866	1870	568,277		
1815	9,336	1871	596,418		
1816	8,619	1872	785,914		
1817	9,284	1873	811,106		
1818	7,920	1874	749,127		
1819	8,692	1875	706,796	7,317,430	
1820	9,980	1876	634,207		
1821	11,388	1877	697,065		
1822	7,512	1878	693,511		
1823	27,000	1879	688,628		
1824		1880	954,659		
1825		1881	1,035,014		
1826	12,600	1882	1,250,179		
1827	12,149	1883	1,297,523		
1828	20,967	1884	1,261,650		
1829	21,935	1885	1,264,510		
1830	27,269	1886	1,373,666	13,910,136	
1831	37,170	1887	1,519,684		
1832	50,369	1888	1,576,692		
1833	64,743	1889	1,755,107		
1834	50,813	1890	1,786,111		
1835	56,434	1891	1,849,945		
1836	107,593	1892	1,752,934		
1837	118,942	*1893	1,485,924		
1838	106,730			1,485,924	
1839	145,962				
1840	101,198	839,954		Total....	36,384,975

SUMMARY.

1785 to 1790.....	14,349	1841 to 1850 .. .. .	1,533,796
1791 to 1800.....	51,048	1851 to 1860 .. .. .	2,399,319
1801 to 1810.....	70,452	1861 to 1870 .. .. .	4,927,339
1811 to 1820.....	91,527	1871 to 1880 .. .. .	7,317,430
1821 to 1830.....	140,820	1881 to 1890 .. .. .	13,910,136
1831 to 1840.....	839,954		

\* Nine months' only.

GOLD—GENERAL STATEMENT FOR NINE MONTHS OF 1893.

MINES REPORT

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.		Total Yield of Gold.	
					Oz.	Dwts.	Oz.	Dwts.
Tangier and } Mooseland }	1	1481	1	1183	6	18	399	12 13
Oldham .....	2	17843	2	2389	1 6	13	3171	9 16
Caribou and } Moose River }	3	13157	4	4701	7	14	1549	15 5
Stormont .....	2	18385	3	7570	9	2	3451	19 8
Salmon River .....	1	6817	1	3220	5	11	882	.. 8
Montagu .....	2	526	2	740	13	19	511	11 8
Lake Catcha .....	3	4078	2	1361	10	18	734	10 0
Fifteen Mile Stream .....	1	2302	1	788	8	22	350	17 0
Uniacke .....	2	10589	2	644	1 8	12	905	11 5
Waverley .....	2	13611	1	5509	5	13	1529	6 ..
Whiteburn .....	2	2364	1	649	13	19	448	11 ..
Unproclaimed and } other Districts. }	5	14356	4	1487	10	14	788	8 ..
	26	97471*	....	28040	.....	.....	14030	5 7

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	UNIACKE.						WAVERLY.							
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January. ....	2	1586	63	.....	.....	..	1	1491	59	519	129	10	..	
February. ....	2	1690	67	12	122	8	1	1334	53	434	153	1	..	
March. ....	3	1698	67	11	82	3	2	1548	61	651	160	7	..	
April. ....	2	692	27	.....	25	..	2	1200	48	550	105	16	..	
May. ....	2	838	33	.....	32	..	2	1455	58	544	123	3	..	
June. ....	2	891	35	240	42	6	2	1574	62	610	164	13	..	
July. ....	1	980	39	55	179	15	1	1533	61	499	243	12	..	
August. ....	2	1061	42	15	143	17	3	1746	69	717	190	7	..	
September. ....	1	1153	46	311	276	21	1	1730	69	985	258	17	..	
Total. ....	....	10589	....	644	905	11	....	13611	....	5509	1529	6	..	
						5							..	

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WHITEBURN.					UNPROCLAIMED AND OTHER DISTRICTS.								
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	1	340	13	.....	....	..	2	2739	109	331	160	10	12	
February.....	..	.....	.....	.....	....	..	3	3138	129	170	36	1	13	
March.....	..	.....	.....	58	30	0	3	3318	132	167	28	9	6	
April.....	..	.....	.....	91	111	6	3	538	21	165	109	2	10	
May.....	..	.....	.....	124	70	9	2	327	13	64	42	9	3	
June.....	..	.....	.....	63	42	16	2	660	26	78	104	18	12	
July.....	2	647	25	155	99	11	3	1305	52	99	108	14	21	
August.....	1	777	31	44	22	0	3	1114	44	282	75	11	15	
September.....	1	600	24	114	72	9	3	1217	48	131	122	10	4	
Total.....	1	2364	....	649	448	11	....	14356	....	1487	788	8	0	

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	TANGIER AND MOOSELAND.						OLDHAM.					
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
January.....	1	474	18	140	44	5 0	1	3438	137	167	223	2 12
February.....	1	469	18	130	36	10 0	2	3049	121	221	79	0 0
March.....	1	538	21	130	30	5 0	2	1843	73	367	503	4 12
April.....	1	.....	.....	.....	45	13 13	2	1658	66	418	279	16 0
May.....	..	.....	.....	150	61	.. ..	1	1624	64	218	409	10 6
June.....	..	.....	.....	150	58	0 0	2	1624	64	346	620	.. ..
July.....	..	.....	.....	178	63	10 0	2	1499	59	216	312	16 0
August.....	..	.....	.....	165	60	0 0	1	1594	63	151	509	.. ..
September.....	..	.....	.....	.....	....	.. ..	2	1514	60	285	234	14 10
Total.....	....	1481	....	1183	399	12 13	....	17843	....	2389	3171	9 16

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	CARIBOU AND MOOSE RIVER.						STORMONT.							
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	3	1865	74	698	356	18	12	2	1668	66	394	305	16	6
February.....	4	1541	61	465	269	0	12	2	2467	98	776	535	16	12
March.....	4	1953	78	530	204	2	12	2	2555	102	1088	561	10	0
April.....	4	1735	69	577	243	6	17	2	738	29	756	389	17	0
May.....	4	2059	82	765	156	13	3	2	1785	71	985	442	2	14
June.....	3	2145	87	686	167	19	12	2	780	31	992	342	4	0
July.....	2	557	22	423	85	0	9	3	3132	125	674	302	19	0
August.....	2	694	27	495	51	6	12	3	1455	58	625	147	7	0
September.....	3	608	24	62	14	7	12	3	3805	152	1280	424	17	0
Total.....	.....	13157	.....	4701	1549	15	5	.....	18385	.....	7570	3451	19	8

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	SALMON RIVER.						MONTAGU.					
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
January .....	1	1210	48	350	90	0 0	1	175	7	209	109	0 0
February .....	1	1298	51	360	106	. .	2	175	7	150	72	0 0
March .....	1	1051	42	350	90	. .	2	176	7	225	186	7 18
April .....	1	.....	.....	355	92	. .	.....	.....	.....	.....	.....	. .
May .....	1	.....	.....	400	84	. .	2	.....	.....	32	16	12 18
June .....	1	.....	.....	400	120	. .	2	.....	.....	34	14	3 10
July .....	1	1066	44	425	115	. .	1	.....	.....	90	113	7 10
August .....	1	1128	45	330	105	. .	.....	.....	.....	.....	.....	. .
September .....	1	1064	42	250	80	. .	.....	.....	.....	.....	.....	. .
Total .....	.....	6817	.....	3220	882	0 0	.....	526	.....	740	511	11 8



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

## MINES REPORT.

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MONTH.	LAKE CATCHA.						FIFTEEN MILE STREAM.								
	No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			
					Oz.	Dwts.	Gra.					Oz.	Dwts.	Gra.	
January.....	2	605	24	.....	...	14	...	...	...	...	...	...	...	...	...
February.....	2	568	22	312	64	14	...	...	...	...	...	...	...	...	...
March.....	2	631	25	149	56	0	0	...	...	...	...	...	...	...	...
April.....	3	69	2	253	79	12	0	...	...	...	...	...	...	...	...
May.....	3	98	3	75	50	4	0	...	...	...	...	...	...	...	...
June.....	3	129	5	209	111	10	...	...	...	...	163	134	...	0	...
July.....	2	556	22	84	77	10	...	756	30	200	93	5	...	0	...
August.....	2	721	28	120	104	...	...	754	30	180	68	14	...	0	...
September.....	3	701	24	159	191	...	...	792	31	245	54	18	...	...	...
Total.....	.....	4078	....	1361	734	10	...	2302	....	788	350	17	...	0	...

## GOLD.

## GENERAL ANNUAL STATEMENT.

YEAR.	Total Ounces of Gold Extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per doz.	
	Oz.	Dwts.	Grs.		Oz.	Dwts.	Grs.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	455
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,922	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	620
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	12081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22202	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
1890	24358	9	9	42749		11	9	160,164	2 73	719
1891	23391	..	..	35212		13	7	149,381	2 80	840
1892	21080	3	18	33633		12	10	120,761	.....	.....
1893*	14030	5	7	28040	.....	.....	.....	97,471	.....	.....
								4,842,579	.....	.....
					565176	9	1	790076	.....	.....

\* Nine months only.

## INTERCOLONIAL RAILWAY.

*Statement showing number of Tons of Coal received at the following Stations, from Mines in Nova Scotia, for the nine months ending September 30th, 1893.*

Destination.	Tons.	Destination.	Tons.
Halifax. ....	56,449½	<i>Brought forward</i> ...	270,178¾
Dartmouth. ....	8,510	Londonderry. ....	48,040½
Bedford. ....	715	Wentworth. ....	12
Windsor Junction. ...	12,100	Greenville. ....	12
Wellington. ....	86	Thompson. ....	6
Enfield. ....	571	Oxford. ....	653½
Elmsdale. ....	190	Pugwash Junction. ..	6
Milford. ....	48	Pugwash. ....	537½
Shubenacadie. ....	604½	Wallace. ....	225
Stewiacke. ....	717½	Tatamagouche. ....	375½
Brookfield. ....	80	Denmark. ....	178
Truro. ....	11,401½	River John. ....	582
Valley. ....	24	Scotsburn. ....	482½
Riversdale. ....	6	Pictou. ....	8,801
West River. ....	54	River Philip. ....	6
Glengarry. ....	12	Salt Springs. ....	20
Hopewell. ....	1,262½	Athol. ....	12
Ferrona Junction. ...	68,086½	Maccan. ....	18
Stellarton. ....	11,186	Nappan. ....	54
New Glasgow. ....	6,939	Amherst. ....	10,141
Trenton. ....	40,309	Aulac. ....	222
Pictou Landing. ....	45,418¾	Sackville. ....	3,252¾
Merigomish. ....	186	Dorchester. ....	1,018
Avondale. ....	56	Memramcook. ....	108
James River. ....	59	Shediac. ....	342
Antigonish. ....	2,718	Point du Chene. ....	28
South River. ....	6	Moncton. ....	19,010
Bayfield. ....	65½	Salisbury. ....	1,159
Tracadie. ....	92	Petitcodiac. ....	539
Harbor au Bouche. ..	68	Penobsquis. ....	12
Mulgrave. ....	2,090	Sussex. ....	225
Belmont. ....	56	Bloomfield. ....	6
Debert. ....	6	Passekeag. ....	6
East Mines. ....	6	Hampton. ....	174
<i>Carried forward</i> ..	270,178¾	<i>Carried forward</i> ..	366,443

INTERCOLONIAL RAILWAY.—*Continued.*

Destination.	Tons.	Destination.	Tons.
<i>Brought forward</i> ..	366,443	<i>Brought forward</i> ...	406,434½
Rothsay.....	165½	Trois Pistoles .....	12
Coldbrook.....	5,110	St. Eloie .....	6
Saint John .....	30,861	Isle Verte.....	29
Harcourt .....	30	St. Arsene.....	18
Kent Junction.....	376	Riv. du Loup. ....	1,584
Chatham Junction ..	2,182	St. Charles Junction.	20
Millerton.....	24	St. Henri Junction..	17,301
Derby Junction ....	6	Chaudiere. ....	83,886
Newcastle. ....	69	Pt. Levis .....	7,806
Red Pine .....	510	G. T. Railway via	
Bathurst .....	42	Chaudiere.....	26,675
Petite Roche.....	12	C. P. Ry. via St. John	4,849
Jacquet River.....	6		
New Mills.....	44	Total.....	548,620½
Charlo .....	6		
Dalhousie .....	6	Forwarded from	
Campbellton.....	75	Spring Hill Junction	243,319
Metapedia.....	407	Maccan.....	24,114
Amqui.....	6	New Glasgow .....	36,132
Cedar Hall. ....	6	Stellarton.....	225,036½
Little Metis.....	6	Westville.....	80,019
St. Flavie.....	18		
Rimouski. ....	18	Total.....	548,620½
Bic .....	6		
<i>Carried forward</i> ..	406,434½		

# INTERCOLONIAL RAILWAY.

Statement showing the different kinds of Coal (in tons) received from the various mines for the use of the Intercolonial Railway from 1st October, 1892, to 30th September, 1893.

MONTH.	Bay of Fundy Co., "Maccan."		Canada Coal & R'y Co., "Joggins."		Cumberland R'y and Coal Co., "Spring Hill."		Acadia Coal Co., "Albion" and "Vale."		Intercolonial Co., "Drummond."		"Gardner," Sydney.		Dominion Coal Co.			Gen. Mining Association, Sydney.	
	Round.	Slack.	Round.	Slack.	Nut.	Round.	Slack.	Coke.	Round.	Round.	Round.	Round.	Round.	Slack.	Round.	Round.	Round.
October, '92.....	.....	.....	3632	.....	.....	4351	1129	.....	3198	14	.....	107	.....	.....	.....	106	311
November ..	122	.....	4280	.....	.....	6820	1024	.....	5475	82	.....	15	.....	.....	.....	241	92
December .....	.....	55	5720	.....	.....	9162	1005	.....	6531	39	.....	52	.....	.....	.....	401	273
January, '93 ..	.....	22	5486	.....	.....	3371	874	.....	5943	57	.....	373	.....	.....	.....	.....	366
February.....	.....	.....	1393	.....	.....	6293	1471	.....	4715	14	.....	100	.....	.....	.....	.....	164
March .....	.....	.....	3796	.....	.....	7541	1521	.....	6733	29	.....	.....	.....	.....	.....	.....	286
April .....	.....	.....	3332	.....	.....	2843	1368	.....	5821	45	.....	.....	.....	.....	.....	.....	20
May .....	.....	.....	1582	.....	.....	4583	624	.....	6297	14	.....	.....	.....	.....	.....	.....	269
June .....	.....	.....	2685	.....	.....	4294	304	.....	5285	58	.....	.....	.....	39	.....	.....	244
July .....	.....	.....	1711	.....	.....	6935	931	.....	3000	.....	.....	.....	.....	.....	.....	.....	35
August .....	.....	.....	2357	.....	5½	5637	855	.....	2749	129	.....	.....	.....	.....	.....	.....	.....
September.....	.....	.....	1433	.....	.....	5729	426	.....	2683	5	.....	.....	.....	.....	.....	.....	.....
Total.....	122	77	37409	67559	5½	11532	486	40	7637	647	748	2514	39	10	2060		



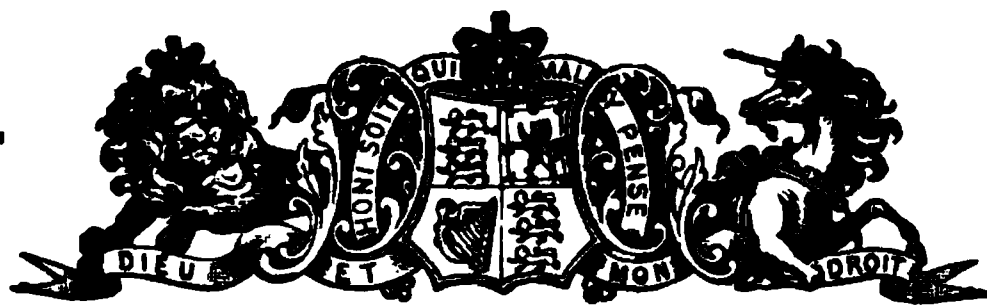






REPORT  
OF THE  
DEPARTMENT OF MINES,  
NOVA SCOTIA,  
FOR THE YEAR ENDING SEPTEMBER 30, 1894.

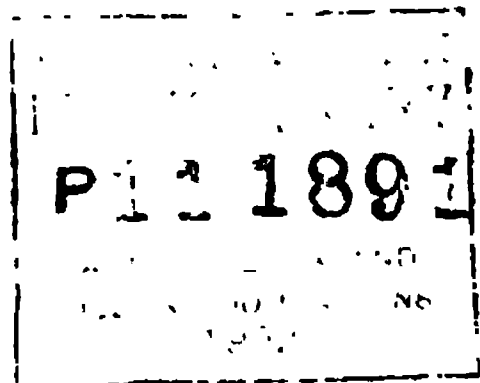
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**REPORT**  
**ON THE**  
**MINES OF NOVA SCOTIA,**

By **EDWIN GILPIN, JR., A. M., F. G. S., LL. D.,**

**Fellow of the Royal Society of Canada, Member of Canadian  
Society of Civil Engineers, etc.**

**OFFICE OF INSPECTOR OF MINES,**  
**HALIFAX, December 1st, 1894.**

**TO THE HONORABLE**

**CHARLES E. CHURCH, M. P. P., M. E. C.,**  
***Commissioner of Public Works and Mines:—***

**SIR,—I beg leave to submit the following report on the Mines of  
Nova Scotia.**

**The following summary shows, so far as I have been able to learn,  
the mineral production of Nova Scotia for the year ending September  
30th, compared with that for the nine months ending September 30th,  
1893:—**

	<b>Nine months ending Sep. 30, 1893.</b>	<b>Year ending Sep. 30, 1894.</b>
<b>Gold.....</b>	<b>14,030</b>	<b>19,980</b>
<b>Iron Ore .....</b>	<b>66,837</b>	<b>83,512</b>
<b>Manganese Ore.....</b>	<b>114</b>	<b>24</b>
<b>Coal raised* .....</b>	<b>1,682,713</b>	<b>2,200,235</b>
<b>Coke made* .....</b>	<b>51,612</b>	<b>59,638</b>
<b>Gypsum† .....</b>	<b>98,247</b>	<b>106,171</b>
<b>Grindstones‡.....</b>	<b>6,971</b>	<b>6,581</b>
<b>Limestone .....</b>	<b>20,684</b>	<b>30,000</b>
<b>Copper Ore .....</b>	<b>1,250</b>	<b>.....</b>

**Ton of 2,240 lbs.**

**† Amount exported.**

**‡ Value in dollars.**

The work of granting certificates required under the Act has been carried on as usual.

The following certificates of competency have been issued by the Board of Colliery Examiners since the date of the last report :

John J. McKenzie, Springhill,	Underground manager.
Thos. Johnston, Westville,	do. do.
Jas. McIntosh, Thorburn,	do. do.
Wm. Maxwell, Westville,	do. do.
Chas Weir, Caledonia,	do. do.
Alex. McKinnon, Bridgeport,	Overman,
Jno. McPherson, Springhill,	do.
A. E. McPherson,	do. do.
S. D. Fraser,	do. do.
Mark Connors, Westville,	do.
Jas. A. Roy,	do. do.
John Gray,	do. do.
Evan McDonald, Thorburn,	do.
Cory Weatherbe, Springhill,	do.
John Conway, Stellarton,	do.
Michael McNeil, Westville,	do.
D. Holland,	do. do.
Jas. Henderson,	do. do.
Alex. McLeod, Thorburn,	do.
Norman McDonald,	do. do.
Jno. McPherson, Glace Bay,	do.
Walter G. Ross, Reserve Mines,	do.
Dan McDonald, Sydney Mines,	do.
H. H. Cameron, Thorburn,	do.

Certificates as Engine men were granted to the following :

Edward Doyle, Joggins,	Second class.
John N. Brophy,	do. do.
Angus Fraser, Springhill,	do.
Hugh W. Munro,	do. do.
Richard Groggett,	do. do.
Joseph S. Price,	do. Third class.
Everett Parks, Thorburn,	First class.
Jno. Hetherington, Bridgeville,	do.
A. S. Frances, Sydney Mines,	Second class.
P. Ratchford, Victoria Mines,	do.
George Brown, Sydney Mines,	do.
W. H. G. Murdoch, Stellarton,	do.
Chas. Slater, Bridgeville,	do.
D. H. McLean, Thorburn,	do.
Edw. Mitchell, Stellarton,	do.
John Hayman, Westville,	do.
Hector Kerr,	do. do.
H. W. Grant, Thorburn,	do.
F. W. Ormiston, Stellarton,	do.

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A. McR. McDonald,	Bridgeville,	Second class.
J. W. Mehean,	do.	Third class.
John Fraser,	Westville,	do.
Jas. W. Sutherland,	Stellarton,	do.
F. McIsaac,	do.	do.
Chas. McNeil,	do.	do.
Wm. Arnold,	Westville,	do.

As regards the work of the Board for granting certificates to colliery officials this year, the new Board has not yet been appointed, but the Schools of Instruction are being carried on as usual, and the services of Mr. A. Dick have been secured to provide, as far as can be managed, instruction in surveying for candidates desiring to undergo examination for certificates as managers. Upon the appointment of the new Board of Examiners, a date will be fixed for the examinations which will presumably take place in the early part of 1895.

During the past season the mineral exhibits of your honorable Government at the World's Columbian Exhibition, Chicago, were nearly all returned. From these exhibits and other sources a set of specimens very fully illustrating the more important mineral resources of the Province is being prepared for shipment to the Imperial Institute, London. A list of these exhibits in the Nova Scotia section of the Institute will be published when completed. It is to be regretted that there are no means available at present for displaying any collections of our minerals where they can be examined by visitors to the Province.

At the Provincial Exhibition, held in Halifax in September last, a very rich and interesting set of specimens of gold bearing quartz was exhibited. A large number of samples of iron ore, gypsum, marble, coal, etc., were available for display at this exhibition, but could not be shown on account of the limited space at my disposal.

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## COAL TRADE.

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The coal returns for this year are for the twelve months ended September 30th, and are comparable with those published in last year's report for the nine months ended September 30th, 1893.

The sales for the period covered by this report are :

Nova Scotia .....	671,883	Tons.
New Brunswick .....	221,844	"
Prince Edward Island .....	63,734	"
Newfoundland .....	97,378	"
Quebec .....	877,743	"
West Indies .....	5,526	"
United States .....	79,837	"
Other Countries .....	1,797	"

Total..... 2,019,742

These sales show increase in the Nova Scotia, Quebec, and United States sales, the other sales remaining little changed in amount.

### CUMBERLAND COUNTY.

In Cumberland County the sales amounted to 479,350 tons. The Joggins Mines sold 81,717 tons, and Springhill sold 394,499 tons. Of the sales, 124,950 tons went to Quebec ; 37,252 tons to the United States, and the balance was used in New Brunswick and Nova Scotia.

At the Springhill Collieries the system of consolidating and simplifying the surface and underground work has been carried on satisfactorily, and further steps are contemplated looking to a reduction in the cost of hoisting, screening, etc. The system of barge towage in the Bay of Fundy from Parrsboro, alluded to in my last report, has been successfully carried out during the past winter, and has demonstrated the value of Parrsboro as an all winter coal shipment harbor.

The Canada Coals and Railway Company have continued their work of development and their arrangements for handling coal in good shape.

A little work has been done at Chignecto, Minudie and at the Scotia Mine. Prospecting has been carried on at Thompson and other points east of Springhill, and have shown that the measures holding coal at Oxford and Salt Springs extend to Greenville and carry indications of the presence of coal seams at several points.

### PICTOU COUNTY.

The sales were 412,039 tons, principally sold in Nova Scotia. The sales to Quebec were 86,967 tons.

The production of the Acadia Company was 235,923 tons ; that of the Intercolonial Coal Company 220,069 tons.



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Operations in this county have presented few new features of interest during the past year. As noted in my last report I append Mr. Fergie's account of the ignition of gas at the Intercolonial Colliery, Aug. 8th, 1893, as published by the Nova Scotia Mining Society.

"The Scott pit shaft is 226 feet deep and down to the second seam which is 12 feet thick, some 8 feet being worked. For some months past the only work done on this seam has been the driving of a pair of slopes to the deep to intersect the main seam by way of a tunnel already driven. These slopes are 2000 feet down, and the driving of them was proceeded with until about the end of July last, when, in consequence of the colliery supply of water for steam purposes showing signs of giving out, they were stopped, and all work confined to the main slopes, the Scott pit being laid idle. Previous to this, the mine had been ventilated by a Schiele fan, but having no steam to spare, in consequence of the scarcity of water, the fan was stopped and the mine received its supply of air by natural ventilation only. The seam being a very gassy one, this mode of ventilation would not be sufficient to keep the mine clear, but as no person was to enter the mine until the normal state of affairs was again restored it was not anticipated that any danger from an explosion of gas could possibly occur. The air of the mine being highly charged with fire damp, the necessary means of ignition were soon to be forthcoming. On the afternoon of the 8th August, about 4.50, there was an electric storm passing over the vicinity of the colliery, and which discharged itself. The general office was struck by lightning, and the front part of the building demolished. At the same time it struck the iron pulleys of the head frame at the Scott pit and travelled down the steel winding rope entering the mine, and instantly igniting the gas accumulated therein, which caused a severe explosion, the force of which demolished the buildings on the surface at the upcast, and at another shallow shaft called the "Stair Pit." The writer, who was sitting writing by his office window, could not distinguish any lapse of time between the thunder clap and the explosion of the mine so simultaneous were they. It being the opinion after the explosion that fire existed below, it was decided without delay, seeing that the ventilating shaft and fan were damaged, also the cages of the winding shaft, to seal up the mine, and this was done without mishap within about an hour and a half. This mine has since remained sealed and will likely be reopened about the end of October when the busy shipping season is over. The writer will then be in a better position to state the actual effects of the explosion underground and proposes to supplement this paper at a later date. Though having read of lightning having entered a mine by way of steel ropes, etc., the writer is not aware of any explosion having been directly traced to that cause before the one now referred to. This accident, which was happily unattended by loss of life, clearly demonstrates that no mine where gas is allowed to accumulate to an explosive point can be considered safe from an explosion when it is connected with the surface by some conductors of electricity such as wire ropes, water pipes, steel rails, etc. It also serves to point out that where bore holes are put down from the surface for the purpose of rope haulage underground these

holes and ropes should not pass through a return airway or where gas is likely at any time to be mixed with the air in high percentage."

I beg to submit herewith the report of W. Maddin, Jr., Esq., Deputy Inspector for the collieries of Pictou and Cumberland Counties:

WESTVILLE, N. S.,  
3rd October, 1894.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines:*

DEAR SIR,—I beg leave to present you herewith the annual report on the mines in the District of Pictou, Colchester and Cumberland for the year ending 30th September, A. D. 1894.

#### ACADIA COAL MINING COMPANY, LIMITED.

MCCREROR PIT, STELLARTON, PICTOU CO.

In this pit work has been steadily carried on for the past years, and a new lift of about 700 feet has been won making the total depth of this mine now about 2,970 feet; they have also driven up through the crop coal and made a connection with the new sinking. The rails on slope road were almost laid at the date of my last visit and, when completed, will facilitate and expedite the raising of the coal and do away with the use of winding engine at pit surface as well also the underground engine. In the new lift a large amount of gas is given off, and at present the work in this section of the mine extending levels east and west is done by mall and wedge, no explosives being used, excepting, of course, in the new winning. A very large area of this mine, too large I fear, is resting on pillars, only a small section of pillars in west side at crop having been extracted; in many such instances a heavy pressure is thus thrown on the pillars which may ultimately engender a creep.

The safety lamps used are the bonneted Clanny and Mueseler.

#### THIRD SLOPE SEAM, STELLARTON, PICTOU COUNTY.

Work has been carried on steadily in this mine for the past year, and various tunnels have been driven to connect with Cage pit seam. The main tunnel is of the length of 240 feet, and some 34 chains west of this on the level another tunnel was driven to connect with same seam, the length of which was only 100 feet, showing conclusively that as they work westwardly the seams are coming closer together. Two drifts at an estimated length of 400 feet are being driven from Cage pit seam to connect with Ford pit seam, through these when completed, the coal will be taken from Ford pit seam and transferred through the new drift from Cage pit seam to the third seam, thence to surface. They are now sinking in the Cage pit seam, and at my last visit were down some 200 feet, the power necessary to carry on this operation is transmitted from the surface through the bore-hole made

mention of in last year's report. The sinking in the third seam which I also reported last year was stopped when down about one hundred feet, and has not been extended any further up to the present time. On the south side of the Cage pit seam one section of pillars has been very successfully won, and also one section worked out longwall, this section is now being built off with brick stoppings and work begun on a new section inside. The object in working by this method, that is to say in sections and isolating them by brick stoppings, is to prevent the damp from descending into the new working which very probably it would do if such stoppings were not built, as the new working is to the dip. Preparations are now being made for erecting a larger fan at this mine.

The lamps used in this mine are of the same pattern as those used at the McGregor mine.

. . .

#### FORD PIT, STELLARTON, PICTOU COUNTY.

An attempt was made to open this pit during the past year, and some work with that aim in view was done in the Fan shaft, but I much regret to state that the damp was found too strong, and work in that direction has ceased for the present.

#### SIX FEET SEAM, THORBURN, PICTOU COUNTY.

Work has been somewhat dull at this mine during the past season. The principal portion of the work done was on the east side of new lift, and some work was done also in the balance in west side between 1100 and 1800 feet levels referred to in last year's report. On the new lift inside, the coal still continues thin, as well also on west side at 1800 feet lift. On the lower lift one balance is worked out and two are now being worked. The airways and travelling ways are in good condition. I would here say that the lock-coil rope of which I made particular mention in 1890, has been in constant use on this slope since that time until last November, when the management decided to take it off, which was then done and it was replaced by a new one of similar construction; the old one is still doing good service in a back balance. At this Colliery the Star open lights are used.

The table at the end of the report gives the amounts and varieties of explosives used at the mines of the Acadia and other Companies.

#### ACADIA MINES, WESTVILLE, PICTOU COUNTY.

This mine has been worked continuously during the past year, the greater part of the coal being taken from the 3600 feet lift. This lift will in all likelihood be worked out this season. On the 4000 feet lift the levels in south side are in 1600 feet, and an incline at 1000 feet from the slope driven up to the 3600 feet lift. The north levels are in 1800 feet, and an incline at 1300 feet from slope driven up to the 3600 feet lift. The temperature in this mine has always been very high since attaining such great depth; this year, however,

two air compressors of Ingersoll Rock Drill Company's make have been added to plant. The work of these compressors is to supply a double engine of 10" cylinder, 11" stroke, with power for hoisting the coal from 4000 feet lift to 3600 feet lift; this engine was made by I. Matheson & Co., of New Glasgow. Also a Knowles pump, 11" cylinder, 12" stroke and 4" water plunger, receives power from the compressors, thus doing away with the necessity of using steam below the 2400 feet lift, at which place the large pump is set. I would also say that the compressed air has lowered the temperature of the mine considerably, the benefit of which is felt all over the mine. I am also pleased to add that notwithstanding such a great pressure and the subsidence in this mine, it is very free from accidents from falls of coal or stone.

The lamps used at this mine are Marsaut and Mueseler.

INTERCOLONIAL COAL MINING CO., WESTVILLE, PICTOU COUNTY.

*Old Slopes.*—The output from this mine has been principally taken from the 3600 feet levels, the north side of which I anticipate will be cleaned out this season. The levels in this side were only 2600 feet long; on the south side there is over 1000 feet of a block of coal yet remaining. On the 4000 feet lift the levels on the north side are in 2000 feet, and on south side 2600 feet, where a balance is being driven up to shorten the returns. This is about all the work done in this mine during the year; these slopes are now down to a depth of about 4350 feet. The engine previously used in this mine for hoisting from the lower lift has been taken up and set at No. 4 slope. The management having decided to concentrate their work as much as possible, built a new engine house at No. 4 slope for the engine above mentioned taken up out of the old slopes, and intend taking up by way of No. 4 slope all the coal lying between the crush and No. 4. There are two faults about 600 feet apart between the old slopes and No. 4 slope, running nearly parallel to No. 4 slope, and all the coal to the dip between these faults will be drawn out by way of No. 4, and as well also the coal lying to the south. The old reservoir for holding water for steam purposes was built in the crop of the coal, and last year a new reservoir to which additions have been made this year, was made. The management have decided to take out all the coal to the crop as well also all the coal to the south of the faults which will give them 2 or 3 years' work at their present rate of progress, thus permitting them to allow the new lift in old slopes to stand for a while. It is probable therefore that the management will erect a more powerful fan to assist them in carrying out these plans. There is a very large area of crushed workings lying to the north of this coal, and as No. 4 slope is aired by furnace ventilation, this furnace will not be competent to supply the requisite volume of air when connection is made with old slopes.

SCOTT PITT, WESTVILLE PICTOU CO.

In this pit the airways have been cleaned up and retimbered and the shaft cleared and timbered and new cages put on. The fan and

fan house is also repaired and fan kept running, this is about all that has been done at this mine since the explosion, but it is intended to sink the slopes this winter. A battery of boilers 300 h. p. has been added to the plant for pump and underground haulage, also a new pump has been put down below the 3600 feet lift.

A new locomotive has been acquired during the past year, and another reservoir made, the capacity of the two reservoirs has been estimated at seven and one-half million gallons of water. At this mine the Marsaut lamp is used, and a Shaw machine for gas determinations.

#### EAST RIVER MINE, NEW GLASGOW, PICTOU COUNTY.

Mr. Wm. P. McNeil kept a small force of men at work at the Pottery Seam until last February, when he closed it down, and it has remained so ever since.

#### SPRING HILL MINES, CUMBERLAND COUNTY.

*Slope No. 1.*—On the 1900 feet lift, east side, with the exception of drawing a few pillars, not much work was done. On west side same lift, levels are being extended and the coal lying between the "stony level" and main level mined and taken out successfully.

A very large quantity of coal has been taken out from the 1300 feet lift, west side pillar working.

On the 2600 feet lift the levels on east side are now in 3500 feet, and connections made for air returns with the 1900 feet lift; inclines have also been driven up at appropriate intervals. On west side same lift the levels are in 3500 feet, and are still being extended, and connection for air returns made with 1900 feet lift, and inclines at suitable points driven up. A new overcast has been made, in which heavy railway iron for support of sidewalls is used in preference to wood; also new steps have been put down in the travelling ways; the slope I consider to be in good condition. Last year I referred to some trouble being experienced on account of the damp in some places where the pillars were being drawn. I might here say that the same difficulty is met on east side of "back seam;" the angle of the coal is high and, although a satisfactory volume of air is kept circulating, yet the damp finds its way down to the level, and it is difficult to get clear of it, but yet this does not prevent them getting the pillars out and winning a good percentage of the coal.

On this lift, "back seam," pillar working is the only work now being done, and the pillars along the level east side No. 2 slope, same lift, are being taken out. Some coal is also taken from the 3000 feet lift, making this the main source of supply to No. 1 slope. The coal from west side "stony level" is passed down an incline to 1900 feet level, so that the principal work in this slope is pillar work.



*No. 2 Slope.*--In this mine the drawing of pillars was continued until the latter part of March, when it was closed and a portion of the coal conveyed to No. 1 slope by inclines. At the same time preparations toward connection at some future date were made, that is to say a dam was made at west side lodgment affording facilities to open up a connection between the 1300 feet lift and 3000 feet lift, and as well provide a lodgment in case of accident to No. 3 pump. The bore hole heretofore used from surface for sinking purposes and opening up the 3000 feet lift is now stopped, and a connection formed between the 1300 feet lift and 3000 feet lift by boring through the lodgment pillar, and the rope taken from hauling engine at 1300 feet lift through this bore hole. New sweeps have been laid at top of sinking in No. 2, and a new overcast made, railway iron for supporting sides being used in preference to wood. Since last report the levels in new lift have been driven a considerable distance, but have not been kept going continuously, as some top coal in the levels had to be "brushed" down and connections made up to 1900 feet levels. I would say that at this date the levels are well timbered and the slope is put in good condition, and from the improvements recently made, to wit: the use of the rope from engine at 1300 feet lift, the sweeps laid in at top and a proper landing at bottom enables them to hoist three times as much coal as they were able to do prior to these improvements. The travelling way in new lift has been stepped and timbered and pipe head timbered.

In the new lift, when in a short distance with the levels, some heavy blowers of fire damp were struck, but no gas has been seen in the mine for a long time past. I might say that although three seams are worked here at depths of from 1300 feet to 3000 feet, the fire-boss for the last few months in his reports seldom makes mention of any trace of gas. If the ventilation is kept up as it should be, there need be no danger of gas in mines that give off no more than we find here, especially in the absence of gunpowder. At present this lift is in good condition, and in process of being well opened up.

*No. 3 Slope.*—Work went on here much as usual until January last, when a boundary line was formed between Nos. 8 and 9 balances on 1300 feet level, or a distance of one mile from slope.

Nos. 3, 4 and 5 balances have been worked out and as well, also, the upper portions of Nos. 6, 7 and 8, and a satisfactory percentage of the coal won. The pillars from railroad bord on lift above have been taken out and run down on this lift, thence taken to surface. The No. 4 slope is now connected with No. 8 balance, and has been repaired and stepped, thus making a good travelling road at extreme west side, also good returns as there are three slopes, to wit,—pipe, travelling and hoisting slope, driven some years ago, and now used for travelling way and return airways.

On east side the level was stopped and all the coal between 800 feet lift and 1300 feet lift taken out from face to return airway.

There was a band of clay in the seam on this side which became thicker as they drove east until it became too thick to work, then the bottom coal was left in and the top coal worked out on the longwall system. They have now driven two places through this band from the main level and got the coal (underseam) which they are now successfully mining. It is four feet thick and of a very good quality; these two places are driven up to 800 feet lift, giving a good return airway. This has now been stepped and re-timbered making a travelling way on the east side, lessening very materially the amount of travelling for the men and boys; the management gracefully did this at the men's request, for which I have no doubt they feel grateful. Work on the 1900 feet lift west has principally been extending the levels which are now in a distance of 4000 feet and also driving No. 6 balance. This level is all well timbered and laid with heavy rails, the turnouts are capable of holding 40 to 50 boxes and nearly all the sheaves are in for the tail rope, and preparations are now being made for further sinking. They have also driven in 700 feet east and west and all double timbered for a lodgment; a pump house is also ready for the pump to be placed in it. On the east the longwall system is still pursued, and is attended with satisfactory results; the levels have been stopped on this side for some time; there are on this side one balance and three inclines, all in working condition ready for any time the necessity of the trade may require an increased output of coal. This mine is in good condition, with good airways and travelling roads, and before this report be printed I anticipate the tail rope will be in use in this section of the mine.

The lamps used by the cutters and loaders are the Shielded Marsauts. The Ashworth Hopper White Gray lamps are used by firemen, etc.

For timber and coal, see tables.

#### CHIGNECTO MINE, CUMBERLAND COUNTY.

For four or five months during the past winter some little work was done along the crop, four or five men being employed, but since last March it has remained idle. Some preparations are now being made to resume work.

#### SCOTIA MINE.

This mine was worked for about the same length of time as the Chignecto, with an equal force of men, and quit operations also about March. Some preparations are now being made to work it this season.

Last year Mr. William Patrick drove a slope down one hundred and some odd feet at a point near Maccan station, on what is considered to be the Chignecto seam, and pierced into the coal. It is the intention to work this slope during the ensuing season. There are three places along the crop of the coal. Natural ventilation is the only means employed to air the mine, as the depth is not much they get along very

well in winter, but in warm weather I would deem it improper to work this mine depending solely on natural ventilation, and would prefer some more satisfactory method be then adopted.

#### MINUDIE MINE, CUMBERLAND COUNTY.

In this mine some operations were began last December, and work continued until June. I was informed then by the management it was intended to sink 200 or 300 feet, they have not however done so; the mine has remained closed from that time. Mr. William Hall of Springhill, had charge of this mine. The seam is 1 foot thick and the cost of "brushing down" permit horses to work in the mine was quite a lot. Mr. Hall substituted oxen instead of horses, they lo below, but performed their work satisfactorily.

#### JOGGINS MINES, CUMBERLAND

In the No. 1 slope the water is being pumped out of working the coal, which is considered to be of a better quality.

At No. 2 slope the system of working has been changed from board and pillar to longwall, it being considered more economical. Manager Mr. Archibald on account of a thick bed of sandstone. A very large amount of work has been done on this slope, and now they are in fair condition. It is necessary to increase the ventilation as the air is so bad and the drag or friction is too great for such present use. The new sinking which has been commenced months and filled with water is now being pumped out. Management having decided to open it up, this will increase the present output. The fault on east side of slope has been run through, and the coal which proved very good is now being rapidly opened up.

In No. 3 slope the work along the crop is being done on pillars, the reason given for adopting this method is that the surface is low and wet.

The workings of 1300 feet lift which are now being opened on this slope.

At No. 2 slope two new double flued boilers have been added to the plant, with a steel stack and trestle works have been built, giving better facilities for fuel to boilers and loading slack coal.

At No. 3 slope two new double flued Lancashire boilers have been added to the plant; also a steel stack 4' 6" x 8' 18" cylinder with a 10 feet drum has also been added. These improvements will materially increase the output of this slope.



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output at this mine. The coal from this mine has heretofore been hauled by horses to No. 2 slope and then cleaned for market. To lessen the cost of handling, etc., a double engine 12" cylinder made by the Ingersoll Rock Drill Co., of Montreal, has been put up and the coal will now be hauled to No. 2 by the tail rope system.

The two Lancashire boilers were made by Robb Co., Engineers, Amherst.

At the loading ground 10" has been added to the height of wharf, thus enabling them to load vessels at all times irrespective of the tides which here rises to a great height. With all these material improvements the ability of the mines to increase the output has been enlarged.

I am Sir,

Yours, very obediently,

WILLIAM MADDIN, JR.,  
*Deputy Inspector of Mines.*



## STATEMENT.

*Timber used at Spring Hill Collieries, from October 1st, 1893 to  
October 1st, 1894.*

## BOOMS :—

$22' \times 12''$	$18' \times 13''$	$14' + 10''$	$14' + 6''$	$12' + 9'' + 10''$	$10\frac{1}{2}' + 9''$
2	32	1,260	23,273	2,649	6,762

## PROPS :—

$12' + 5''$	$10' + 5''$	$5\frac{1}{2}' + 5''$
26,468	5,2484	31,191

Plank .....	274,096 feet
Boards .....	220,400 "
Scantling .....	445,673 "
Spruce Timber .....	136,011 "
Hardwood .....	177,920 "
Pit Penning .....	1,306 Dozen
Slabs .....	2,185
Cup Pieces .....	20,295
Rollerwood .....	10,122 feet

## ACCIDENTS.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	1893. Sept. 13.	Joggins.	Jabez Pike.	Shiftman.	Killed, rope broke in slope and full rake ran over him.
2	Oct. 3	Drummond.	A. Smith.	"	Arm broke, accident.
3	" 13.	Spring Hill, No 2 slope	L. Totten.	Shover-down.	Leg broken, by a piece of coal in shoot.
4	" "	" " 3 "	J. Welcher.	Loader.	Leg broken, by fall of coal in No 8 balance.
5	" 20.	Joggins.	G. Pringle.	Miner.	Leg broken, by fall of coal from working face.
6	" 21.	McGregor Pit.	W. McKay.	Driver.	Leg broken, between shafts on horse and the box.
7	Nov. 16.	Spring Hill, No. 3 slope	A. V. Cameron.	Miner.	Hurt by a fall of stone from working face.
8	" 14.	" " 2 "	J. F. McDonald.	"	Hurt by a fall of stone in shoot.
9	Dec. 1.	Joggins.	Paul Brian.	"	Slightly burned by gas. [letting roof down.
10	Nov. 18.	Spring Hill, No. 1 slope	James Tebo.	Loader.	Killed, full box struck prop from under boom
11	Dec. 11.	Acadia.	Charles Davidson.	Shiftman.	Killed, squeezed between box and timber on a shoot.
12	" 14.	Drummond.	John McDonald.	Miner.	Leg broke, fall of coal from face.
13	1894. Jan. 7	Joggins.	Peter Murphy.	"	Foot injured, fall of stone.
14	Feb. 16.	Spring Hill, No. 2 slope	George Millard.	Trip-runner.	Leg caught going through a door.
15	" 20.	" " 3 "	James McSavaney.	Loader.	Leg broken, by fall of coal. [him.
16	" 26.	3rd Seam.	Alex. Foster.	Chain-runner.	Killed, draw bar broke and full rake ran over
17	" 26.	" "	Saml. Munro.	Cage-runner.	Leg broke, finger broke and hand bruised, caught with rope and taken over drum barrel.
18	May 7.	Spring Hill, No. 2 slope	Ezra Miller.	Miner.	Leg broken, fall of stone at working face.
19	" 16.	" " 3 "	James Caldwell, Jr	Cage-runner.	Hurt, caught between the box and timber.

20	May 23.	Joggins.	B. Louseberg.	Machinist.	Jaw broke, while moving an engine.
21	Apr. 14.	Spring Hill, No. 3 slope	M. Berzay.	Miner.	Hurt by fall of stone from face.
22	" 14.	" " 3	Henry Fox.	"	Hurt by fall of stone from face.
23	May 3.	Thorburn, 6 foot seam.	Joseph Vassarat.	"	Burnt, spark from his lamp fell into his powder can igniting in his hand.
24	" 8.	Drummond.	Thomas Hale.	Driver.	Leg broke, getting on a rake in motion.
25	June 21.	"	Robert Wallace.	Miner.	Arm and leg broke, fall of top coal.
26	July 11.	Spring Hill, No. 3 slope	Joseph Moss.	"	Hurt, in pushing a box which struck a prop, it fell on him together with the rock.
27	" 16.	" " 1	Charles S. Brown.	"	Hurt by fall of coal from face.
28	" 19.	Drummond.	Guthro Holland.	"	Leg crushed between balance cage and landing.
29	" 30.	Spring Hill, No. 1 slope	Frank George.	Loader.	Leg broke, taking coal down shoot.
30	Aug. 13.	" " 1	James McSavaney.	Night Examiner.	Leg broke, piece of coal run down shoot and struck him.
31	" 8.	Drummond.	A. Cassidy.	Laborer.	In trimming cars he fell, the cars passed over his hand, necessitating amputation.
32	" 16.	Spring Hill, No. 3 slope	E. Truesdale.	Miner.	A piece of coal slipped and squeezed him against prop.
33	" 21.	Albion Mine.	Charles Nelson.	Loader.	Spine dislocated, riding on a full box.
34	" 31.	Drummond.	E. Pero.	Locomotive Driver	Fatally hurt, while under engine oiling it, two full hoppers struck locomotive and moved it on top of him.
35	Sept. 5.	"	D. H. McDonald.	Miner.	Hurt by tree falling on him, that was dislodged by a fall of stone.
36	" 7.	Joggins.	James Hays.	Shiftman.	Hurt, taking rails down the pit on a trolley.
37	" 24.	Drummond.	Francis Cassidy.	Switch-boy.	Killed, coupling broke in main slope, the boxes running back struck him.

## MINES REPORT.

*Amount of Air, measured by me at visits, circulating in Cubic feet per minute.*

[illegible]

Official Visits from 1st October, 1893, to 1st October, 1894.

MINES REPORT.

MINE.	County.	DATES OF VISITS.											
		1893.						1894.					
		Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.
Third Seam .....	Pictou.	3	16	20	18	13	10	16	10	25	30	.....	5
McGregor Pit .....	"	2	15	18	5	15	27	11	9	21	25	.....	4
Drummond Col'ry	"	4	14	11	4	1	15	9	8	19	24	29	{ 18 20
Acadia .....	"	17	10	12	23	21	22	14	12	18	26	28	20
Sixfeet Seam .....	"	21	17	16	.....	2	24	13	21	26	31	.....	6
Pictou Charcoal }	"	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
Iron Mine }	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scott Pit .....	"	.....	.....	11	16	1	19	Idle.	.....	.....	.....	.....	.....
Pottery Mine .....	"	21	17	16	24	2	Idle.	.....	.....	.....	.....	.....	.....
No. 4 Slope }	"	.....	.....	.....	.....	3	19	Idle.	.....	.....	.....	.....	.....
Drummond mine }	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springhill { No. 1.	Cumberland.	10	8	1	12	6	1	3	3	2	3	.....	10
" " 2.	"	11	9	2	10	7	3	4	5	3	4	.....	10
" " 3.	"	10	8	1	11	6	2	3	4	2	3	.....	12
Joggins .....	"	13	10	4	9	9	5	6	2	4	5	6	13
Minudie .....	"	.....	.....	4	9	10	6	5	1	5	Idle.	.....	.....
Scotia .....	"	.....	2	8	8	6	Idle.	.....	.....	.....	.....	.....	.....
Chignecto .....	"	.....	5	8	8	6	.....	.....	.....	.....	.....	.....	.....
Cape Breton .....	"	.....	.....	.....	.....	.....	.....	.....	23	.....	.....	.....	.....
Gold Mines .....	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	11 to 21	.....	.....

W. MADDIN, JR., Deputy Inspector of Mines.

### CAPE BRETON COUNTY.

The sales from this County amounted to 1,114,773 tons. The total output of the Companies being:—

Dominion Coal Co.....	950,683 tons.
General Mining Association.....	234,672 "

Since my last report the Low Point, Barasois and Lingan Company have sold their property to the Dominion Coal Company. At present the coal production of the County is divided between this company and the General Mining Association, working the Sydney Mines. During the past year the same company has acquired the McColl lease at Bridgeport, and the sub-marine areas extending from Black Rock, on the Bras d'Or Lake, to the sub-marine area at present worked by the General Mining Association. It is also reported that this company has purchased the three Block House leases. The interest in coal properties, induced by the amalgamation of the mines in this district alluded to in the last departmental report, has continued during the summer. Messrs. A. J. McPherson and others spent much time testing the outcrops of the Cossitt and other seams lying between Sydney and Mira. The results show that there is in this locality a long narrow synclinal basin holding several seams of coal up to nearly three feet in thickness. And that further to the eastward, on the hypothetical projection of the outcrop of the Tracy seams, there is a set of small beds of coal having a regular dip agreeing with that which prevails all the way from Sydney to Glace Bay. Three of these seams are said to vary in thickness up to four feet six inches. If further exploration shows that there is this thickness of workable coal, an important addition will have been made to the coal resources of the district. At the head of Lingan Bay, a seam of coal from four to six feet thick has been traced for about a mile from the shore. This is believed by some local authorities to be the extension of the Mullin's seam, known between Lingan Bay and Victoria Mines. It is to be hoped that all parties interested would unite in procuring a good diamond boring machine, so that all the district lying west of the present coal field could be properly tested, and its value as a coal producing district either proved or disproved.

I submit the report of P. Neville, Esq., Deputy Inspector for the Island of Cape Breton, for the past season:—

E. GILPIN, JR., ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave to forward you a short report of the coal mines for the year ending September 30th, 1894. There has been such great improvements in the different mines under the Syndicate (Dominion Coal Co.) that it is almost impossible for me to give you a detailed report. I will merely confine myself to the underground



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works as usual, and note the more prominent surface changes. I also append a note on the systems of lighting adopted and amount of powder used at each colliery.

#### GOWRIE MINES.

This mine has worked very steadily during the season. Levels on the south-east side have been extended as usual. In No. 2, East level, an engine, 8×10 geared 1 to 5, has been placed for the purpose of hauling from No. 2 and No. 3 levels by means of tail rope; it is hauling a distance of 3000 feet and gives satisfaction.

On the west side of the east deep a face of about 1200 feet has been opened out for the purpose of working it on the long wall system. A Mitchell long wall machine has been working there for the last two months; it is doing pretty good work, cuts about 180 feet in a shift of 10 hours, and undercuts an average of 30 inches. An angle deep has been driven from No. 2 to No. 3 level 250 yards, hauling the coal by tail rope, shortening haulage by horses. The west slope side has done nothing this season, as the coal has all been pretty much worked up to the anticlinal. A line of pipes has been laid from Sand Lake to the mines, a distance of 3500 feet, by which ample water is obtained.

#### CALEDONIA.

A smoke stack 125 feet high with six foot flue; an engine and boiler house have been reconstructed and made larger; six Babcock boilers of 200 horse power each have been put in; one Rand compressor, capable of driving fifty coal cutting machines working eighty pounds pressure; one pair of hoisting engines 20"×48" cylinders, 3', 6" stroke, and one pair of engines for hoisting and lowering men, 10 inch. cylinder and 12 inch. stroke, with back balance. An iron bank head and pit frame has been erected, which is 85 feet high to the pulleys, 70 feet to where the cages dump the coal into screens. Two self dumping cages and screening apparatus are in operation, and are now doing well. A line of pipe has been laid to the Glace Bay brook, 2000 feet, and water pumped from an engine placed there to the reservoir and main boilers.

The hoisting shaft has been enlarged and a portion of it partitioned off for the men to ride in. A covered cage is put in for that purpose. The two bank heads from west and east deeps and the approaches to the shaft have been regraded and enlarged. The upper west level has been cleaned, timbered and enlarged, and a double road for over 2000 feet laid in, for the purpose of hauling the coal from that district by the tail rope system.

The west levels have been driven 600 feet each by the Stanley Header.

The east deeps have been extended about 600 feet, and the levels to the south driven 700 feet, and north levels 1000 feet.

The output from Caledonia Mine was restricted very much for the first two months of the season, owing to the new machinery not being completed. Since then, however, a larger tonnage than in previous years has been raised. Three thousand additional feet of railway sidings have been laid down and many colliery buildings put up.

#### LITTLE GLACE BAY.

Levels have been extended in the rise and deeps. The west level has been widened and a double road laid from the pit bottom in along to the face, a distance of 600 yards, for the purpose of tail rope haulage. And an engine, 18" x 36" cylinder geared 6 to 1, is in course of erection for the purpose of hauling the coal to the pit bottom. Six Harrison and three Ingersoll coal cutting machines are working, and a Rand Air Compressor to supply the compressed air.

A large pump has been placed in the deep for the purpose of pumping the water to the pit bottom, instead of hauling by tub and engine as heretofore. A branch line of railroad has been laid which connects the pit with the main railway.

#### INTERNATIONAL.

On surface—A new engine and boiler house has been built. The levels on the north and south sides of the pit have been continued and rooms worked as usual.

#### DOMINION No. 1.

On the old Bridgeport area a shaft, known as Dominion No. 1, has been sunk 147 feet to what is called the Phalen Seam, which is 8 feet six inches thick there. The underground workings are opened up by driving four deeps, which are now down 500 feet each. Two headways have been driven from the shaft to the old water level; also two pair of levels are being driven south from the shaft, from which rooms and headways are driven. The coal is hoisted through this shaft where slides and cages have been put in, and a small engine house erected, where an engine has been placed which raises the coal for the present.

The water from the pit is pumped by a large steam pump. An air shaft 10 feet in diameter has been sunk. A large engine house is being built, 102 feet by 55 feet wide, in which four Ingersoll compressors are to be placed, and one pair of hoisting engines, cylinders 20" x 54"; also a pair of smaller engines for hoisting and lowering men. A smoke stack 125 feet high, base 16 feet, has been erected. Railroad and sidings have been constructed. Two locomotives, of about 61 tons each, have been imported and working. Also coal cars and iron shipping tubs, flat cars, etc. Sixty-seven

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miners' cottages and four houses for officials have also been built. At Caledonia, Glace Bay and International over 60 miners' houses have been erected, and new offices, machine-shops, round-house, ware house and other buildings, have also been erected.

#### OLD BRIDGEPORT.

The south levels, since my last report, have been connected with the Reserve Mine workings, liberating a large quantity of water; also doing away with pumping of water from the main slope at the Reserve Mines, and opening up a large section of coal, 1500 feet by 900 feet, which is being mined and hauled up the Reserve Mine slope.

At a point about 350 feet from the shaft on the south side of the pit, a pair of deeps have been driven down a distance of 700 feet each; those deeps are being driven by the Stanley Header, and started off and worked by coal cutting machines.

An underground haulage engine has been placed at the pit bottom, which hauls the coal a distance of 500 yards on the tail rope system, and is supplied with steam from the boilers on surface.

The shaft has been enlarged for the self tipping cages which are giving satisfaction. A new heapstead, built all of hard pine, 86 feet by 34 feet and 52 feet high, has been erected. A new engine house which contains the winding engine, with a pair of cylinders 14" x 18", an air compressor of the Ingersoll type, the size of the largest is 20" x 30" cylinder, and the smaller one 20" x 24" cylinder; two new tubular boilers of 80 horse power each have also been erected, making four in all, which are supplied by water pumped from the brook mentioned in my last report by a No. 5 Cameron pump, which also supplies Dominion No. 1 with water, which runs from the reservoir through 4 inch diameter pipes, laid 4 feet below the surface, a distance of 3300 feet; a new blacksmith's forge, a ware house and office have been built. A large hotel or boarding house and ten miners' cottages are being at present built.

#### RESERVE MINES.

The south side levels have been continued on about 254 yards, and the north levels about 258 yards. The coal mined and taken out of the pit this season has chiefly been mined in the district opened out toward Old Bridgeport workings. About fifteen pairs of men have been drawing pillars above the water level during the most part of the year. In the French or east slope the road has been widened, and the roof and sides secured. A double road has been laid a distance of 4000 feet, on which the coal is hauled to the bankhead by an endless rope, which gives good satisfaction. The empty tubs can be taken off or detached from the rope at any landing and full ones put on and the rope in motion, so there is no stopping.

**EMERY.**

This colliery has been closed since December last, and the pumps and rails taken out, the seam being considered too thin to work at present.

**GARDNER MINES.**

This mine was also closed in December last, the management thinking that it would pay the workmen and the company better to mine the thick seams.

**VICTORIA MINES.**

Two new cylinders, 26 inch. diameter, instead of the 24 inch. previously used, have been put in use. Also two new multitubular boilers have been erected which steam the hoisting engine. The center slope has been enlarged and driven down about 400 feet, and a double track laid throughout. This has been connected by levels with the west deep slope. The latter has been abandoned, and the whole of the coal west of the centre slope is hauled up through this. Levels on the east and west side of the slopes have been continued. The water has been pumped out of the district which was flooded three years ago. A bore-hole 8 inch. diameter is being put down from the surface to the pump room for the purpose of pumping the water vertically. The west slope is now used for a travelling road. The output raised to 700 tons a day.

**SYDNEY MINES.**

As usual have been working steady during the most part of the year. No. 1 landing was extended 250 yards further to the deep in February last. No. 4 landing or platform was extended 200 yards to the deep; also No. 3 landing was extended 240 yards further to the deep gaining grip. The seam looks well, and the workings in good condition. On the surface a new Murphy Ventilating Fan of 10 feet diameter was put up in July to assist the Guibal 30 feet fan when desirable, and to take the place and do the work when the latter is undergoing repairs.

Twenty-one new coal cars holding 6 tons of coal each have been put in use. A new Fairbank's Track Scale, to weigh twenty tons, was put up on the Railway line near the pit to weigh the cars of coal and replace the old pulley scale hitherto in use.

To increase the supply of good water for the steam boiler, a bore-hole 5 inches in diameter was put down to a depth of 283 feet, a little west of the main reservoir, and a feeder of about 10 gallons of water per minute is obtained thereat. A Rider engine worked by hot air instead of steam was set up, and pumps the water from the bore-hole. In order to increase the flow of water from the reservoir to the pit, 3500 feet of four inch pipe were taken out, and replaced by wrought iron pipe five inches in diameter.

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A feed water heater is being erected near the Princess Pits winding engine. The feed water for use of the boilers will flow through this heater, in which it will be warmed by the exhaust steam from the winding engine.

NEW CAMPBELLTON.

The deeps have been extended 375 feet; levels turned off north and south and driven 500 feet each. The air course has been changed from the north side of the slope to the south side, giving it more area and less friction to the air going to the furnace. A 30 horse power boiler, locomotive pattern, has been put in to assist in steaming the pumps, and a 110 horse power boiler to supply steam to compressor. Five Sargent coal cutting machines are now at work, driven by compressed air supplied by a 16" x 18" Sargent-Ingersoll compressor. A new boiler shed and compressor house have been built. A six feet seam of bright, clean looking coal has been opened on this property north of the present working. The seam has been discovered in the bottom of a brook that runs from the mountain. It shows three feet six inches of coal, six inches of fire clay and two feet of coal. This is most likely the same seam that has been worked in the side of the mountain by Mr. Charles Campbell years ago.

I have the honor to be

Your most obedient servant,

P. NEVILLE,

*Deputy Inspector of Mines.*

The following memo gives the type of lamps used at the collieries, variety of oils used, and quantity of explosives consumed, during the year ending September 30th, 1894.

*Sydney Mines.*—Naked lights. The Kilmarnock pattern of small tin lamps, burning seal and cod oil, is used by all the colliers coal getting. Davy and Mueseler safety lamps are used by the Deputy in examining the working faces daily before the colliers go in. Gunpowder is exclusively used for blasting purposes, and during the year the quantity supplied to the colliers was 35,258 pounds.

*Victoria.*—Naked lights. Small tin lamps, Bickett-Kilmarnock pattern, burning seal oil. Marsaut safety lamps used by Deputies. There were 18,500 pounds of powder consumed by colliers.

*Dominion No. 1.*—Small tin lamps, Kilmarnock pattern, used by colliers. Seal oil burned. Davy and Clanny safety lamps used in examining workings. There were 5,133 pounds of powder consumed in coal getting.

*Old Bridgeport.*—Kilmarnock lamps, small pattern. Seal and cod oil burned. Davy and Mueseler safety lamps used by Deputies. Nine thousand pounds of powder consumed, also 375 pounds of dynamite for blasting coal mined by Stanley Header.

*Reserve Mines.*—The same type of tin lamps as above described. Seal oil burned. Davy lamps used by Deputies. The powder consumed amounted to 26,609 pounds.

*International.*—Open lights, small pattern Bickett. Seal and cod oils burned. Davy and other safety lamps used. There were 13,233 pounds of powder used.

*Little Glace Bay.*—Naked lights. Small tin Bickett lamps used. Davy lamps used for examining mines. Eleven thousand nine-hundred and seventy pounds of powder consumed.

*Caledonia.*—Naked lights. Kilmarnock pattern of small tin lamps burning seal oil. Davy and Mueseler lamps for examining by Deputies; also Wells' patent for lighting pit bottom, burning kerosene oil. Gunpowder consumed blasting coal 28,000 pounds.

*Gowrie Mines.*—Open lights, small tin Bickett and Kilmarnock patterns. Seal and cod oil used. Davy and Mueseler lamps used by Deputies. Gunpowder used. One thousand five hundred and forty pounds consumed coal getting. The coal in the mines is taken down by maul and wedge with the exception of the narrow places, such as deeps, levels and crosscuts. In the Dominion Co's mines, besides what I have given above, there has been 15,000 pounds of gunpowder consumed in various ways through the pits.

*New Campbellton.*—Naked lights. Small tin lamps used, burning seal and cod oils. Davy lamp used for examining mine. Three thousand and twenty-five pounds of gunpowder used.

P. NEVILLE,  
*Deputy Inspector.*

## ACCIDENTS IN CAPE BRETON MINES, YEAR ENDING SEPTEMBER, 1894.

DATE	NAME	OCCUPATION.	AGE.	REMARKS.
Nov. 6....	Dominion No. 1	D. A. McNeil	22	Leg broke, fell in sinking pit.
" 10....	Sydney	Patrick Walsh	40	Killed by fall of coal from working face.
" 23....	International	Vin. McCormick	16	Killed by fall of roof coal at face.
" 28....	Victoria	John McSween	16	Slightly burned by gas putting up Brattica.
" 30....	"	D. McAskill	17	Killed, caught by full cage on balance.
Mar. 10...	Reserve	John Martin	32	Killed by piece of coal from roof.
" 16...	Caledonia	Ronald Ferguson	19	Killed by dynamite explosion while heating it.
Apr. 20...	Reserve	Duncan Finlayson	45	Three ribs broke by piece of coal from roof.
May 20...	Dominion No. 1	Joseph Burns	52	Hand badly bruised, caught by cog of winch.
" 31...	Reserve	John Finlayson	20	by fall of coal. Died 15 days after.
June 7....	Victoria	John Knight	35	back by piece of coal from face.
" 9....	Little Glace Bay	Nor. Carmichael	27	is broke by piece of coal from face.
July 21...	International	James Fortune	13	by full trip on deep road.
" 27...	Little Glace Bay	Peter Campbell	38	caught by full tub against pillar.
Aug. 6....	Old Bridgeport	Wil Lugdon	40	and back hurt by piece of coal from face.
" 14....	Dominion No. 1	Stephen Fraser	20	feet from smoke stack, died 5 days after.
" 31....	"	Peter Callaghan	35	burned by gas.
Sept. 1....	International	Angus McIntyre	16	ke, caught between tub and shaft.



Cubic feet of Air Measured in Cape Breton Mines.

MINES.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.
Gowrie .....	38290	39000	35000	39000	30020	36000	37900	35000	32000	32500	30000	34220
Caledonia .....	40000	42200	18980	112978	40000	48000	48120	75100	59360	68000	68880	68200
Little Glace Bay .....	37000	37800	37520	33100	22320	24600	24000	22100	46100	31210	33600	29830
International .....	85460	68100	25000	.....	.....	73000	72850	66200	67000	68140	70000	69500
Reserve .....	40000	40000	42000	40909	39000	46025	42500	50000	55500	59000	61500	61910
Emery .....	33500	23000	21000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Bridgeport .....	25000	25500	25000	21000	25000	29000	28000	23520	18600	18700	25000	24800
Dominion No. 1 .....	.....	.....	.....	.....	.....	.....	.....	.....	2020	2120	6500	6950
Gardner .....	22000	19000	16005	.....	.....	.....	.....	.....	.....	.....	.....	.....
Victoria .....	61000	61000	50000	42100	62000	62020	56000	60000	69050	67000	63100	65100
Sydney .....	58000	73915	70000	73310	70800	70018	60000	60050	63300	63210	59800	63420
New Campbellton .....	.....	10000	.....	.....	.....	10100	.....	.....	9900	10200	.....	11220



OFFICIAL VISITS, YEAR ENDING SEPTEMBER, 1894.

MINE.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.
Gowrie .....	19	22,	20	27	9	1	3	8	11	19	24	13
Caledonia .....	16	17	19	20	1	10	6	7	4	6	29	5
" .....						19			18			
Little Glace Bay .....	12	22	13	19	26	3	28	5	8	7	17	12.
International .....	26	24	22			24	23	26	6	23	20	19
Reserve .....	13	11	11	9	3	9	17	28	9	10	23	11
" .....						11				24		
Emery .....	11	16	6									
Old Bridgeport .....	11	4	5	12	6	13	19	29	27	11	16	18
Dominion No. 1 .....					24	14	7	26	28	9	21	8
" .....						9				10		
Gardner .....	14	15	4									
Victoria .....	6	21	1	11	2	27	2	9	13	16	35	22
" .....	17		7									
Sydney .....	24	6	19	6	15	7	31	25	16	21	28	29
" .....		13										
New Campbellton .....		29				5			29	17		25

P. NEVILLE,  
*Deputy Inspector.*

## MISCELLANEOUS.

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In Victoria County the Messrs. Burchell have been engaged in reopening and fitting up the Campbellton Colliery, and will be in a position to carry on steady work next season. They report that they are engaged in prospecting for a large seam overlying the one at present worked.

In Inverness and Richmond Counties little work has been done, except at Broad Cove. At this point some work has been done in the way of testing the value and course of the seams, and surveys have been made and tenders called for opening McIsaac's Pond as a shipping point.

In Hants and Colchester Counties some prospecting has been done. In the latter County it is reported that a five feet seam of coal was bored through at Kemptown. A number of licenses to search have been applied for surrounding the situation of the original discovery.

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## EXPLOSIONS FROM COALDUST IN MINES.

### ENGLISH COMMISSION.

The commissioners appointed to enquire into the effect of coaldust in originating or extending explosions in mines, whether by itself or in conjunction with firedamp, and also to enquire whether there are any practicable means of preventing or mitigating any dangers that may arise from the presence of coaldust in mines, have presented their final report.

The Commission was appointed on February 9th, 1891. The duty imposed upon it was entered upon without delay, and the evidence was taken from March 13th to July 14th, 1891. The proceedings were then adjourned, and the first report, containing the evidence taken in 1891, was presented on July 30th, 1891. In the following year the examination of witnesses was resumed from February 12th to April 8th, and again in 1894 further evidence was taken in regard to an explosion which had occurred in the New Pit, Camerton Colliery, near Radstock, on 13th November, 1893.

Meanwhile, the Commissioners considered that it would be desirable to have special experiments made in order to test the inflammability of different kinds of coaldust, and after communicating with

the Secretary of State for the Home Department, it was arranged that Mr. Henry Hall, Inspector of Mines for the Liverpool district, should undertake a series of coaldust experiments to include dusts collected from the principal seams in the respective mining districts, to be tested as to their inflammability in the same way as he had already done with certain Lancashire dusts in January, 1893. Accordingly, Mr. Hall obtained fifty-two samples from forty-five collieries and from thirty-six separate seams, and these, with the exception of four or five samples, were fully tested at the White Moss Colliery, Skelmersdale, Ormskirk, in the months of May, June and July, with the results that will be referred to later in the course of this report.

During the course of the enquiry thirty-nine witnesses have tendered evidence. Among them are included the Permanent Secretary of the Home Department, mining inspectors, colliery proprietors and managers, mining engineers, scientific authorities and representatives of different institutions and associations connected with the mining industry. The views of the colliers were obtained from four of the officials of their associations. The chief coalfields in Great Britain have been represented, namely, Durham (East and West), Lancashire, Yorkshire, Derbyshire, Staffordshire (North and South), South Wales and Monmouthshire, Somersetshire, the Forest of Dean, and the east and west of Scotland. Thus the Commission have collected evidence, not only on the general question, but also on the special circumstances of every important district. A great amount of evidence has been given with reference to the various experiments that have been made, and also with regard to many of the large explosions which have occurred in Great Britain. During the course of the enquiry fatal explosions have occurred at the Sladderhill Pit, at Apedale, Staffordshire, on 2nd April, 1891; at the Malago Vale Colliery, Bristol, on 31st August, 1891; at the Park Slip Colliery, Tondur, on 26th August, 1892, and at the New Pit, Camerton Colliery, near Radstock, on 13th November, 1893. In each case the circumstances attending the disaster have been enquired into on the spot by members of the Commission.

#### SUMMARY OF CONCLUSIONS.

The following is a summary of the conclusions at which the Commissioners have arrived in the course of their enquiry:—

1. The danger of explosion in a mine in which gas exists, even in very small quantities, is greatly increased by the presence of coaldust.
2. A gas explosion in a fiery mine may be intensified and carried on indefinitely by coaldust raised by the explosion itself.
3. Coaldust alone, without the presence of any gas at all, may cause a dangerous explosion if ignited by a blown-out shot or other

violent inflammation. To produce such a result, however, the conditions must be exceptional, and are only likely to be produced on rare occasions.

4. Different dusts are inflammable, and consequently dangerous, in varying degrees; but it cannot be said with absolute certainty that any dust is entirely free from risk.

5. There appears to be no probability that a dangerous explosion of coaldust alone could ever be produced in a mine by a naked light or ordinary flame.

#### RECOMMENDATIONS.

Mr. Woods stands alone in his desire to prohibit all shot-firing—whether by gunpowder or by any of the high or so-called flameless explosives—in mines which give off any gas; and no mine, he considers, is safe from an irruption of firedamp, “except under very exceptional circumstances.” In place of explosives, he would substitute the wedge. He admits that the wedge could not be used in the rock, and in that case allows that some of the patent explosives, if under proper supervision and only fired when the men were out of the pit, might be resorted to with perfect safety. It is generally agreed that to abolish shot-firing would, in many instances, be the means of closing a large number of collieries, especially those working thin seams where there is much hard roof to take down and bottom to cut. The extra cost of production would exclude such collieries from the market, and would throw many thousands of men out of employment. In South Wales, it is pointed out, the increased cost of working would be 1s. per ton or even more, and it would be quite impossible to carry them on at a profit except by the aid of explosives. Some witnesses urge the re-enactment of the provision of the former Act which required that shot-firing should be carried on between the shifts. They maintain that this should be the practice, even where the high explosives are used, until it is conclusively shown that they are safe in gas as well as in dust. This precaution is adopted by the Cannock and Rugeley Colliery Company, and is found to have the further advantage of lessening the amount of shot-firing required by the men. The Shelton Iron, Steel and Coal Company, although using a gelatinous cartridge which they consider perfectly flameless, in dangerous places only fire when the workers are out of the pit.

Although there is a strong feeling that to prohibit shot-firing generally is unnecessary even in dry and dusty and in fiery mines, it appears to be a common practice in such cases to substitute some of the higher explosives for gunpowder, and it is submitted by many witnesses that in dry and dusty mines gunpowder may be discharged with a prospect of much greater safety. Other witnesses have declared that it is quite unnecessary to prohibit the use of gunpowder in collieries like those of the Forest of Dean, which are quite free from gas, and the Radstock non-fiery seams. The experiments made

by Mr. Hall, as well as the general experience of all engaged in coal mining, show that a violent inflammation is necessary to initiate a coaldust explosion, and that this may be set up by a blown-out shot or other failure of an ordinary gunpowder blasting cartridge. Mr. Hall, however, has not succeeded in obtaining any explosion when what are called flameless explosives have been used by him in his experiments. The experiments at Ostrau are stated by the Austrian Commissioners to have shown that black powder and its congeners are highly dangerous for fiery mines in which there is coaldust, and that even in water cartridges these explosives do not give sufficient safety.

Many different patent explosives have been brought to the notice of the Commission. The so-called "flameless explosives" are largely in use in all parts of the country, and as the result of practical experience are generally pronounced to be effective substitutes for gunpowder, and certainly very much safer. Each of these compositions has its advocates, and each is said to be flameless or practically so. As far as dust is concerned the current opinion appears to be that they are perfectly safe, but there is considerable doubt as to how far the small flash or scintillation which many witnesses say they display, renders them dangerous in the presence of gas. As regards the expense, one of the patent explosives is said to cost about the same as gunpowder, taking into consideration the quantity used. Two others are said to entail the same expenditure as gunpowder, but the electric firing apparatus makes the expense rather greater. There is a feeling on the part of some managers that gunpowder is in practice safer than any of the high or flameless explosives. Understanding that the latter are perfectly safe, the workmen do not take a proper amount of care. Gunpowder, moreover, they are more familiar with. It is further objected by some witnesses that the flameless explosives are not so effective as gunpowder, especially in rock. It is obvious that both the safety of the so-called flameless explosives and the innocuousness of the fumes resulting from their explosion, must greatly depend upon the proper and regular composition of the explosives themselves. Mr. Lucas speaks highly of a gelatinous cartridge which he uses in conjunction with the higher explosives, and considers it unnecessary to damp when this cartridge is used. Its use puts on about 1½d. per ton over the cost of working with gunpowder. The Austrian Commissioners report highly of an explosive called Wetterdynamite, and their experiments show that loose charges of this substance failed to ignite the most dangerous coaldust in the absence of firedamp. The Commissioners accordingly report that the safety obtained with soda-wetterdynamite is very great and almost absolute.

Dr. Dickinson knows of no defect in the water cartridge, but the other witnesses who have spoken about it agree in condemning it as troublesome to use, and on that account a source of danger.

The lime cartridge is not much in use. With some kinds of coal it fails to act satisfactorily. In other cases, Sir F. Abel thinks there is an unreasonable prejudice against it.

On a review of the whole of the evidence on this point, the Commissioners have come to the conclusion that whatever minor objections may be established against the use of high explosives, their general employment would greatly limit the risk of explosion in dry and dusty, and in fiery mines. Having regard, however, to statements which have been made by several witnesses that the abolition of the use of gunpowder would stop the working of many collieries, and bearing in mind the great variety of conditions under which different mines have to be carried on, as well as the various qualities and quantity of dust, and the method of working, they do not feel justified in recommending the universal abolition of the use of gunpowder. On the other hand they think that the conclusive proof which the evidence has afforded of the great additional danger caused by the use of gunpowder justifies a considerable advance in the direction of the abolition of the use of gunpowder in dry and dusty mines unless a sufficient and effectual means of watering the dust be systematically carried out. Section 42 of the Coal Mines Regulation Act, 1887, provides that:—"If in any respect (which is not provided against by any express provision of this Act, or by any special rule) any Inspector finds any mine, or any part thereof, or any matter, thing or practice in or connected with any such mine, or with the control, management or direction thereof by the manager to be dangerous or defective, so as in his opinion to threaten or tend to the bodily injury of any person, he may give notice in writing thereof to the owner, agent or manager of the mine, and shall state in the notice the particulars in which he considers the mine, or any part thereof, or any matter, thing or practice to be dangerous or defective, and require the same to be remedied; and unless the same be forthwith remedied shall also report the same to the Secretary of State." The section also provides for arbitration in the event of the owners, agent or manager of the mine objecting to carry out the requisition of the Inspector. Under this section it is already possible for an Inspector to require the discontinuance of the use of gunpowder, but it has been suggested that the section was intended to apply only to exceptional cases, and not to remedy conditions of risk which may apply to a large number of coal mines now at work.

In order to remove any doubts on this question, it is recommended that by further legislation power should be given to the Secretary of State to prohibit the use of gunpowder in the case of every mine which is either fiery or dry and dusty, unless sufficient and effectual means of watering are carried out. As, however, it is not possible at the present time to lay down a stereotyped definition of what constitutes a fiery mine, or a dry and dusty mine, it will be necessary to allow of some discretion in cases where the decision of the Home Office upon this point may be reasonably disputed by the owners of the mines affected.

The Commissioners recommend, therefore, that on the passing of such an Act as is suggested, the Secretary of State should prepare a list of mines to which the provision should apply, and that notice should immediately be given to all the owners of such mines, and



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that they should be required within twelve months to carry out the requisition. The Secretary of State should also be empowered to add to this list from time to time whenever he is satisfied that any mine, not previously on the list, should be subject to the same provision.

If any owner objects on the ground that his mine is not properly described as a fiery mine, or a dry and dusty mine, or that the means provided for watering are sufficient protection, it is recommended that he should have power to appeal to a Temporary Commission to be appointed by the Act in order to deal with such appeals. The Commission should be empowered to take evidence and, if it thinks fit, to examine the mine and to decide finally whether in its opinion it is desirable in the interests of safety to life that special precautions as to efficient watering should be put in force in the mine or that the use of gunpowder should be discontinued, and the requisition of the Home Department should then be either affirmed or withdrawn according to the decision of the Commission.

Where an exemption shall have been granted by the Commission, and subsequent to such exemption an explosion takes place which can be reasonably attributed to the use of gunpowder, in the mine exempted or any neighboring mine, the Secretary of State should have power to place any such mine on the list of those to which the provision for the abolition of the use of gunpowder applies.

The evidence taken as to the action of different so-called flameless explosives leads the Commissioners to believe that several of them may be practically safe for all purposes, and it is probable that the experiments now being carried on by the North of England Institute of Mining Engineers, at Hebburn, will throw additional light on the subject; besides which, it is probable that from time to time the progress of invention will produce new explosives of equal or greater merit, and it is recommended that all explosives used in mines should, after examination and experiment undertaken by the Home Office, be from time to time certified by the Secretary of State for the Home Department as proper to be employed for the purpose.

The Commissioners are of opinion that the practice of using bituminous shale, or other material containing volatile inflammable matter, or of clay mixed with coaldust, increase the dangers from blasting. At Apedale Colliery a bituminous shale was used for stemming the shot which blew out and caused the explosion. General Rule 12, Section *d*, of the Coal Mines Regulation Act, 1887, prohibits the use of coal or coaldust for tamping. Witnesses have stated that it is a common practice in some districts to use shale, or under-clay, mixed with coaldust for tamping shots. The Commissioners think that the rule should be made more stringent and should declare that all tamping should be done with clay or other non-inflammable substances.

The adoption of these recommendations will, they believe, have the effect of reducing to a minimum the danger of explosions in non-fiery mines, by preventing the initiation of an explosion by blown-out shots acting on an accumulation of coaldust.

There will remain, however, the risk of an explosion of gas in a fiery mine which might be initiated by a naked light, or even by some of the so-called flameless explosives, and carried on and intensified so as to be much more dangerous than it otherwise would be to life and property by clouds of coaldust raised by the first and continued by subsequent explosions.

Dust-tight tubs have been suggested in order to prevent the accumulation of dust in the haulage roads. In cases where the condition of the strata makes watering a difficult and dangerous operation, such waggons would, it is said, alleviate the evil and tend greatly to keep these roads free from dust. To introduce them into collieries already being worked would, it is admitted, very much limit the output.

A large quantity of dust is carried down by the ventillation from the screens into the intake aircourses. This does not, however, appear to be a matter which can be easily remedied.

The removal of the dust has also been advocated by various witnesses, and no doubt in many cases the danger may be lessened by this means. In some instances the dust might be got rid of, but there are many collieries where removal is entirely out of the question. The witnesses are almost unanimous in agreeing with Mr. Hall that removal is not an effectual remedy, although it has been urged that as far as possible it should be resorted to even when further precautions are taken. This opinion is confirmed by the report of the Austrian Commissioners, who say that sweeping out the dust where shots are fired is troublesome, and will rarely be properly carried out.

While recommending that every effort should be made to prevent undue accumulations of dust, it appears that the only effectual way of dealing with this source of danger would be a satisfactory system of watering and thoroughly wetting it. This precaution is already largely adopted in Durham, South Wales, Staffordshire, Yorkshire, and Derbyshire. In other districts little damping appears to be done. It is alleged by many witnesses from various parts of the country that watering would cause serious trouble in the roads by loosening the the strata, and thus bringing down the timbers and roof and lifting the floors. On the other hand, it is said that this danger only exists when too much water is used. Other witnesses contend that watering is quite practicable, and that when once saturated the dust is kept in a damp state with little trouble. In addition to damping the floor, Mr. J. B. Atkinson and Mr. W. N. Atkinson maintain that it is necessary to water the roof and sides of the roads with a hose. On the contrary, others are of the opinion that to water the floor is all that is necessary. Other witnesses would confine watering to the main haulage roads and the working faces, and other places where there is a special accumulation. Many witnesses advocate the watering of the roads quite as much as a sanitary measure as a preventive of explosions. No evidence had been given to show that



the miners object to the practice; on the contrary, it is said that they find that it makes the mines cool and more comfortable to work in. Whereas it may be impossible to maintain the whole of the roads in a thoroughly damp state, it is urged that parts of the main roads might be kept damp enough to arrest the course of an explosion, and thus confine it to a section of the mine. The length of such damp patches to serve this purpose should be, it is estimated by various witnesses, from 70 yards to 200 yards. The Austrian Commissioners reported that watering was undoubtedly useful, but would not guarantee thorough safety unless all the roadways and working places, including the roofs and sides, were effectively carried out without very great, and in some cases, insurmountable difficulties.

In some of the South Wales mines perfect saturation of the atmosphere is said to be obtained by a system in which the mere pressure of the water is sufficient to produce a spray. Among other mines, this system is in operation in those belonging to the Glamorgan Coal Company. A pressure sufficient to secure a thorough division of the water is essential, and in the case described by the general manager of these collieries, the average pressure per square inch is 280 lbs. The number of the jets depends entirely upon the size of the road and the quantity of air passing. In the collieries in question, it appears that the jets are placed about every 40 yards in the main roads, while the average velocity of the air is 8 or 9 feet per second. In the intake and the return the sprays are kept continually going, but in the working places, where thorough saturation of the air would render it unpleasant for the men to work, the sprays are only turned on for two hours at a time. Three diagrams were displayed showing the humidity in the air: (1) when the jets had been idle for four days; (2) when the jets were playing and the surface temperature was nearly normal; (3) when the jets were playing in frosty weather. In Case 1, the weather at the surface was cold and foggy with 88 per cent. humidity in the air, and throughout the workings 80 per cent. was about the highest humidity that was registered, while there was a difference of 4 degs. between the dry and the wet bulb. In Case 2, when it was raining heavily at the surface, practically complete saturation was obtained, the dry bulb registering 50, and the wet bulb 49½. In frosty weather the spray is not so effective, and it appears to be impossible to obtain complete saturation of the air. This is shown by Case 3, taken with a temperature of 31 degs. at the surface; 91 per cent. of humidity was the highest obtainable, and it is said that this is not sufficient for the main roads, which should contain 100 per cent. of the moisture. When the weather is frosty recourse is had to a jet, which is placed at the top of the downcast, for the purpose of serving as an auxiliary to the water jets.

The spray system, in conjunction with compressed air, is highly spoken of by Mr. W. N. Atkinson, Mr. H. W. Martin, Mr. Wilkinson, and other witnesses from South Wales, where it is in operation in several mines. After an inspection of it at the South Tunnel Pit, belonging to the Dowlais Iron Company, Mr. W. N. Atkinson says:—  
“There are about 1,200 yards of pipe in use on engine-plane and

horse-haulage roads. The sprays are from 40 to 100 yards apart. The compressed air is at a pressure of from 35 lb. to 45 lb. per square inch. The compressed air has a marked effect, and produces a much finer spray than I have ever seen caused by water alone, even when under very high pressure. The distance for which spray is effectual for damping the dust also appears to be greater than when compressed air is not used. There was a very large amount of the finest coaldust on the upper surfaces of the engine-plane, and much coaldust and *debris* on the floor. The effect of the sprays, as I observed it on this road, was, in my opinion, adequate to prevent the passage of an explosion by coaldust. At odd places a little dry dust could be found where it was shielded from the action of the moisture, but the great bulk of the dust was so thoroughly moistened that I believe the passage of flame due to coaldust would be impossible. The time during which the sprays should be kept in operation, and the intervals which may elapse without them, will require careful attention, but I am strongly inclined to believe that they can be made effectual to prevent the initiation or extension of an explosion by coaldust."

The Commissioners have carefully considered the evidence on this question from all sides, and while they are of opinion that the only sufficient precaution hitherto suggested against the dangers of coaldust in fiery mines is a complete and satisfactory system of watering, they also feel that the same reasons which have prevented them from recommending a universal and stereotyped rule in regard to the use of gunpowder, apply with equal or even greater force to the provision of expensive and probably complicated systems of watering. They are, therefore, of opinion that, in any case in which the inspectors think it desirable, in order to ensure the safety of life, they should use the powers given by section 42 of the Act of 1887 to declare that the provision for watering the dust in a mine is insufficient, and to require such further arrangements to be made for this purpose as they may prescribe.

If the owner of the mine objects to carry out these requirements, he will have the right of appeal in accordance with the provisions of that section.

In any case in which a sufficient provision for watering the dust, approved by the inspector, has been made, either voluntarily or in consequence of such a requisition as is above referred to, they think that the owner of the mine may be relieved of the obligation to discontinue the use of gunpowder.

They also recommend that the following precautions (already partly provided for in the existing Mines Acts) should receive the special attention of those responsible for the management of coal mines:

First, that the firing of shots should be carried out between the shafts and when the majority of the men are out of the mine.

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Second, where general watering is not prescribed by the inspector, that the roads or either side of the place where a shot is fired should be thoroughly wetted for a space of at least 30 yards, and

Lastly, that large accumulations of dust, whether on the roof or floor, should be allowed to remain.

The report is signed by Mr. Chamberlain (chairman), Lord Rayleigh, Sir. W. T. Lewis, Mr. H. B. Dixon, Mr. Emerson Bainbridge and Mr. C. Fenwick, M. P.

The conclusions arrived at by the Commission are, as regards sections 1 and 3, corroborated in the writer opinion, by the experience of Nova Scotia coal mines. As yet, in his opinion, no case of explosion in Nova Scotia has occurred in which coal dust alone was concerned.

The evidence presented to the commission, as viewed in the above summary taken from the Colliery Guardian of July 20th, 1894, shows very plainly the reluctance with which British coal miners view any departure from the old fashioned system of blasting with gunpowder. In face of the positive evidence afforded by numerous cases, it was long before the old fashioned miner would consent to use even a Geordie or Davy, as a substitute for an open light, even where gas was known to be continually given off. It is the same with gunpowder, in spite of the many accidents traced to its use, the old traditions die hard, and many mining men declare to day that they consider gunpowder quite as safe as any of the so called flameless explosives.

The lessons of experience have, however, been taken more closely to heart here apparently than in England, and so much heed has been given to the action of flameless explosives, that credence was given some years ago to the recommendation of the Nova Scotia Commission on Explosives, that the use of so-called flameless explosives, while safer than gunpowder, should be permitted only with all the precautions surrounding the use of gunpowder where gas has been found. This recommendation is now repeated by the North of England Institute Commission, which reported the other day. The indications are that in a short time in England the practice followed in Nova Scotia will be adopted, that of a prompt and ready relegation of a mine to the "gassy" rank, whenever it is found that gas appears periodically even in minute quantities, and the prohibition of explosives. Already here a large proportion of coal is cut by maul and wedge, and mining experience is not looking upon any so-called flameless explosive hitherto introduced with such trust as to permit its use except with the greatest precaution.

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## GOLD.

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The returns for the year ending Sept. 30th, show 14,980 oz., 7 dwt., 13 grains, from 39,333 tons of quarts. This is the smallest return since 1882, when the yield was 14,107 ounces. The extreme dryness of the summer is reported to have necessitated a stoppage of the water power mills and to have seriously interfered with the work of the steam mills.

Surveys have been made at Lake Catcha, Preston, Sheet Harbor, Broad Cove, Isaacs Harbor, and Mooseland, by Messrs. J. F. Anderson and C. W. Pye.

During the past year the principal mines were visited by Mr. Maddin, with the exception of a few in the western part of the province which he was prevented by illness from inspecting. I append the following memo of his visits, and beg to draw your attention to his remarks as to desirability of plans being insisted on from all persons mining or prospecting.

WESTVILLE, N. S.

3rd October, 1894.

E. GILPIN, ESQ.,

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I have during the past season visited the following mentioned gold mines in Guysborough and Halifax Counties, a condensed report of which I herewith submit:—

*Crow's Nest Gold Mine.*—F. H. Puttner, Underground Manager. At this mine a tunnel is being driven across the belt that will cut the leads 108 feet below the surface. At a distance of 33 feet in the tunnel they cut a belt with two leads or veins and another at 66 feet, also at 123 feet in them is a belt 7 feet thick, mined with quartz veins, and also at 135 feet, and 141 feet and at 164 feet, belts have been cut, the last mentioned one is 4 feet thick; also several other small leads have been cut. They are drifting or were at time of visit July 11th, on the 7 feet belt east. There are 14 men employed and prospects look promising.

*Country Harbor Gold Mines.*—J. G. Mason, Underground Manager. The shaft is now down 200 feet on a very rich belt, 10 to 12 feet thick. In this mine there are 6 or 7 breaks in the belt eastwardly, making it difficult to keep the wall up, yet the mine looks very well, as a large amount of timber has been placed to good advantage on it.

Prospects and matters in general look very well around this mine. There are 35 men employed and the mill is capable of crushing 25 tons per 24 hands.

COUNTRY HARBOR, GUYSBORO Co.

*Antigonish Mining Company.*—J. C. McDonald, Manager, and J. Mason, underground manager, with 36 men employed. They have a rock-breaker at work and the mill is self-feeding, there is also an air compressor capable of running 3 drills, these drills are used for drifting and sinking. This mine has also considerable breaks on the belt, making it difficult to timber, but as there is a large amount of good timber set to advantage, I should think the mine safe.

ISAAC'S HARBOR, GUYSBORO Co.

*North Star Mine* is idle. However, the Manager, R. M. McLeod, has 14 men prospecting on the property.

ISAAC'S HARBOR, GUYSBORO COUNTY.

*Richardson Gold Mining Company.*—C. F. Andrews, Manager. At this mine they are building a new rock-breaker, and new bank house, and remodelling and improving the machinery about the mill, which will be self-feeding when improvements are completed. On the new bank the tipples are self-acting. The ore after passing through the rock-breaker will fall into the boxes and be taken to mill by tail rope. The mine was idle at time of visit on account of these changes which were being made; the water was out of the mine however, and I had an opportunity of seeing it, of which I availed myself; it appeared satisfactory.

*Cochrane Hill Mine.*—A. H. McQuarrie, Manager. Duncan Rankin, Underground Manager. Twelve men employed. Not much work done or going on here at time of visit, the bulk of the work being overground. A new boarding house, 30' x 26', has been built with an ell, 24' x 16', two stories, and all furnished. Now they are putting up a new mill, new blacksmith's shop and new tramway to carry the ore from shaft to mill; this tramway will be 427 feet long, and average height 20 feet. They are also putting up a new house for rock-breaking. There is here also an air compressor capable of running 4 drills. The engine which hoists from shaft will have 4 drums that can be placed at any angle required, so that they with this arrangement can hoist from different shafts situated at right angles to each other if such a necessity arises.

A considerable amount of work has been done underground, to wit: the Mitchell shaft, so-called, is 70 feet deep, and drifted 67 feet west and 31 feet east. The Rankin shaft is down 20 feet and they are still sinking it deeper. A tunnel driven in Mitchell shaft, going north a distance of 55 feet, cut two belts, one 2' 6", and one 2' thick; also several smaller belts all showing gold. All of these belts are tested for a short distance by drifts of from 12 to 20 feet. There is one belt 4 feet thick, 85 feet south of the Mitchell shaft, in which there is a lot of work done. Nearly every place opened up shows gold.

*Eureka Gold Mining Co., Wine Harbor.*—A. McQuarrie, Underground Manager, with 18 men employed. On the Eureka lead at time of visit a shaft was down 110 feet, in which they were still sinking. A new blacksmiths' shop and new engine house has been built. Several old shafts are being pumped out with a view of enlarging the work.

This is an old mine and several tunnels have by former operators been driven different lengths and depths, of which neither plans or records have been kept, and there are absolutely nothing to indicate what has been done. In view of the difficulty and loss encountered in this way it would appear to me as eminently necessary that reliable plans should be kept of all work done, and would venture to suggest that some means be employed whereby plans and records of not only the actual mining but prospecting as well be made and kept, so that succeeding operators will not be required at loss of time and money to do the same work over again. It is oftentimes a difficult and serious matter to begin work in an old mine with drifts and tunnels of various and unknown lengths. It is common in many instances to find the tunnels has cut a lead, as at this mine there is a large sump or excavation made of probably 100 feet or more on the lead. I have seen several mines with such places laying filled up with water. This may be all right provided plans and records be kept, giving the requisite information in respect to them, but with no such information, and the men who have done the work gone away, then the men who have ventured to open these works up finds in many instances they are caught in a difficult and expensive undertaking for which adequate preparations have not been made.

Matthew McGrath has two men prospecting Dr. MacKay's property, and has cut some new leads which were very small but showed gold.

The old plough lead is being pumped out with a view of working. As the water at time of visit was not out I could not see what it looked like, yet I do know it is a wide belt and will require a lot of timber to make it safe before opening up new ground, and this the manager says he will have done at once.

*The Canada Gold Mining Co., Goldenville.*—Mr. John McQuarrie, Manager. Fourteen men employed. The workings in the "Wentworth" lead were being pumped out, also the workings of another lead to the south. The shaft (an old one) looked very rough and was undergoing some repairs.

*The Anderson Mine.*—Five men are employed here, also 3 or 4 men prospecting east of McNaughton's.

*The Springfield Mine.*—R. McNaughton, Manager. One shaft is down 60 feet. and to the south one down 40 feet, 17 men are employed. There is a tunnel driven south 300 feet, cutting 15 belts of which 7 show gold. These are other shafts being opened up. This mine is showing gold very well and looks to be well timbered and ventilated.



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*Ecum Secum Mine.*—Malcolm Cameron, Manager. Eleven men employed sinking two shafts on the south dip, one of which is down 60 feet and the other 40 feet.

*Harrigan Cove.*—Edward Whidden, Manager. Four men employed sinking on the Archibald lead, which is 14 inches thick, here then is a 10 stamp mill in good running order, also a small portable engine for running pump and sinking purposes. The mine has been idle for some time. Some parties are prospecting on this locality and prospects are very encouraging.

*The Dufferin Gold Mining Co.*—H. Archibald, Manager; R. Irving, Underground Manager. Fourteen men employed. At No. 3 shaft work was being carried on at the date of visit. There is another 6 feet belt cut south of the present work. Preparations are now being made to begin sinking in the belt now being worked.

*Killag Mine.*—D. S. Turnbull, Manager; 6 men employed. This mine is fairly well timbered and the travelling way is good. They have drifted north 103 feet, and south 62 feet, and are still driving. These drifts are down 100 feet. The main shafts is 166 feet deep. There is a very good 10 stamp mill here, also a rocker-breaker, the one passes from rock-breaker to the mill on sheets. The mill is a self-feeder. The plant is arranged very well to handle the ore cheaply. Good rubber hose is placed around the buildings in case of fire—taken all throughout it is a fairly well-equipped mine.

*Moose River Gold Mines.*—D. Touquoy, Manager; Thomas Reynolds, Underground Manager. Twenty men are employed. The big north lead and little north lead are down 130 feet. The big north is very much broken up and should have more timber. The Underground Manager says he will have more timber placed at once. The mine is well ventilated and looks fairly well, still a little more timber would be an improvement and might prevent an accident. The little copper lead is also down 130 feet. It is in good condition and well timbered.

*The Montreal Mining Co.*—Robert Russell is Manager, and has 6 men working in two old shafts down 40 feet. These old shafts look rough. Mr. Russell assures me he is going to timber and fix up the shaft at once.

Andrew McGregor has 3 men working on same property at principally surface works, which appears to pay very well.

James Dull has 6 men working on tribute in a shaft 60 feet deep, same property.

Charles Stevens has 4 men working in a shaft 100 feet deep, these all are on the Montreal property.

Timber is difficult to get in this section, all those men, however, have promised to pay attention to the timbering and have some more put in at once.

#### CARIBOU GOLD MINES.

*Dickson Mine.*—H. Dickson, Manager. Main shaft down 230 feet. Twenty-five men are employed. The mine is in good condition. On the "Touquoy" flat lead so called which is now being worked, a shaft is down 40 feet and 5 men employed, and also 7 men erecting a 10 stamp mill.

*Truro Mining Co.*—G. W. Stewart, Manager. Main shaft down 235 feet, and a drift is down some 200 feet, in which they have driven west 125 feet and east 15 feet, and are still at work extending the same 15 men are employed. This mine has been idle for most part of the year and has only properly started now.

*Lake Lead Mine.*—W. H. Saunders, Manager. Fourteen men employed. This mine has had a proper good timbering since I was last at it, and is now in good condition. There is a very broad belt in this mine, and it requires lots of good timber to keep it safe. It is now down say 100 feet perpendicular, and 300 feet, on a very high angle.

I am sir,

Yours very obediently,

WILLIAM MADDIN, JR.,  
*Deputy Inspector of Mines.*

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#### GYPSUM.

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During the past season the returns of gypsum sales so far as received show a falling off, the total shipments being 106,171 tons. I am not aware of any developments of new quarries, etc.

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#### IRON MINING.

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During the year ending September 30th, 1894, the New Glasgow Iron, Coal and Railway Company continued mining on the East River, Pictou County, and at Arisaig, Antigonish County. The returns show that in the latter County 1,376 tons of ore were mined from the Arisaig, Ross and Iron Brook Mines; and that in Pictou



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County 37,603 tons were mined from the Cameron, Black Rock, Fraser and McDonald Grant Mines. In the latter part of the year a contract was made with the Torbrook Iron Company, Annapolis County, to supply some Torbrook ore, for mixture with the East River ores.

The following totals of materials were used at the Ferrona furnace from October 1st, 1893, to September 30th, 1894 :—

Coke.....	40,826 Tons.
Coal .....	3,705 "
Ore .....	59,171 "
Lime.....	21,209 "
Millscale.....	1,735 "

At Londonderry the work of the past year presents no special points of interest. The returns show that the East and West mines were worked, yielding 9,214 tons, ore supplies were also drawn from Torbrook. The Lanark limestone quarry yielded 8,893 tons of flux.

Work was continued as usual at Torbrook. The returns show that 21,664 tons were mined for furnace supplies at Ferrona and Londonderry. Reports have been received of discoveries of valuable beds of ore in this district, but in the present depressed state of the iron market no work has been done in the way of exploration, here or at other points in the Province, where workable deposits are believed to exist.

The Pictou Charcoal Iron Company continued mining during the year, and report that 2,611 tons of ore were treated in the furnace, which was put in blast shortly before the close of the year, and that 11,043 tons of ore were mined and sold.

I remain,

Yours truly,

E. GILPIN, JR.,  
*Inspector of Mines.*

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

IRON.

No. of Lease	Name of Owner.	County.	Agent or Manager.	Address.	No. of Sg. Miles.
84.....	Prothero, P.....	Cape Breton.	.....	.....	1
86 93.....	Moseley, E. T.....	"	.....	.....	2
.....	McLean, Jno.....	"	.....	.....	1
91.....	Brookman, Phoebe ..	"	.....	.....	1
92.....	Matheson, D.....	"	.....	.....	1
102.....	Smith, W.....	"	.....	.....	1
103.....	McKenzie, H R.....	"	.....	.....	1
104.....	McKenzie, J. W.....	"	.....	.....	1
43, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59 .....	Bartlett, J. H.....	Pictou.....	.....	.....	15
76, 81.....	Pictou Charcoal Iron Co .....	"	.....	.....	2
60, 68, 70, 71, 0 .....	New Glasgow Iron Coal & R'y Co..	"	Grah'm Fraser	New Glasgow.	5
72, 73, 75, 77, 78, 79, 80 .....	Holmes, S. H.....	"	.....	.....	7
61, 67.....	Cameron, Jno. A.....	"	.....	.....	1
1.....	McIntosh, J. C.....	Hants.....	.....	.....	1
2.....	McDonald, L.....	Antigonish..	.....	.....	1
92.....	McAloney, Jno.....	Cumberland.	.....	.....	1
5.....	McDougald, Jno .....	Antigonish..	.....	.....	1
10.....	Fraser, W. J.....	Inverness...	.....	.....	1
16.....	Inverness, C. I., R'y Co.....	"	.....	.....	1

1, 2 .....	New Glasgow Iron, Coal & R'y Co.	Guysboro .....	2
74 .....	Andrews, H. M. ....	Pictou .....	1
22 .....	McMillan, Jno. ....	Inverness .....	1
			<u>49</u>
COPPER.			
145 .....	Drummond R (& Iron) .....	Cape Breton .....	1
142 .....	Le Cras, Henry .....	" .....	1
126 .....	Matheson, A. ....	" .....	1
116 .....	Greener, John .....	" .....	1
106, 95 .....	Eastern Dev. Co .....	" .....	2
105, 181 .....	Burchell, J. E. ....	" .....	1
94 .....	McKenzie, D. ....	" .....	1
2 .....	Grant, J. A. ....	Antigonish .....	1
3 .....	Gray, B. G. ....	" .....	1
4 .....	McInnis, Hugh .....	" .....	1
12 .....	Jones, A. C. ....	Inverness .....	1
7 .....	Nichols, T. ....	Victoria .....	1
6 .....	Hardman, J. E. ....	" .....	1
21 .....	Manley, A. J. ....	Inverness .....	1
25 .....	Cove, J. W. ....	Colchester .....	1
			<u>16</u>
LEAD.			
143 .....	Silver Mining Co. ....	Cape Breton .....	1
2, 3 .....	" .....	Colchester .....	2
0 .....	" .....	Guysboro .....	1
			<u>4</u>
	TOTAL OF		

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.

No. of Lease.	Name of Owner.	County.	Agent or Manager.	Address.	No. of Sq. Miles.
1/3, 2/3, 3, 4, 62, 63, 64, 69 5/12, 6/13, 9/14 8/6 10/24 11/11, 45, 10 66/46 .....	Acadia Coal Co ..... Intercolonial Coal Mining Co ..... New Glasgow Iron, Coal & R'y Co.. Richey, M. H. .... Gray, B. G. .... Fergie, C. .... McNeil, W. P. ....	Pictou ..... " ..... " ..... " ..... " ..... " .....	H. S Poole.. C. Fergie... ..... ..... ..... ..... .....	Stellarton .. Westville ... ..... ..... ..... ..... .....	18 3 1 1 4 1 1
56, 2/1, 74, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104 55, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88 90 8/5 6/12 15 9/22, 1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12, 1/13, 1/14, 1/15, 1/16, 1/17, 1/18, 1/19, 1/20, 1/21, 1/22, 1/23, 1/24, 1/25, 1/26, 1/27, 1/28, 1/29, 1/30, 1/31, 1/32, 1/33, 1/34, 1/35, 1/36, 1/37, 1/38, 1/39, 1/40, 1/41, 1/42, 1/43, 1/44, 1/45, 1/46, 1/47, 1/48, 1/49, 1/50, 1/51, 1/52, 1/53, 1/54, 1/55, 1/56, 1/57, 1/58, 1/59, 1/60, 1/61, 1/62, 1/63, 1/64, 1/65, 1/66, 1/67, 1/68, 1/69, 1/70, 1/71, 1/72, 1/73, 1/74, 1/75, 1/76, 1/77, 1/78, 1/79, 1/80, 1/81, 1/82, 1/83, 1/84, 1/85, 1/86, 1/87, 1/88, 1/89, 1/90, 1/91, 1/92, 1/93, 1/94, 1/95, 1/96, 1/97, 1/98, 1/99, 1/100, 1/101, 1/102, 1/103, 1/104, 1/105, 1/106, 1/107, 1/108, 1/109, 1/110, 1/111, 1/112, 1/113, 1/114, 1/115, 1/116, 1/117, 1/118, 1/119, 1/120, 1/121, 1/122, 1/123, 1/124, 1/125, 1/126, 1/127, 1/128, 1/129, 1/130, 1/131, 1/132, 1/133, 1/134, 1/135, 1/136, 1/137, 1/138, 1/139, 1/140, 1/141, 1/142, 1/143, 1/144, 1/145, 1/146, 1/147, 1/148, 1/149, 1/150, 1/151, 1/152, 1/153, 1/154, 1/155, 1/156, 1/157, 1/158, 1/159, 1/160, 1/161, 1/162, 1/163, 1/164, 1/165, 1/166, 1/167, 1/168, 1/169, 1/170, 1/171, 1/172, 1/173, 1/174, 1/175, 1/176, 1/177, 1/178, 1/179, 1/180, 1/181, 1/182, 1/183, 1/184, 1/185, 1/186, 1/187, 1/188, 1/189, 1/190, 1/191, 1/192, 1/193, 1/194, 1/195, 1/196, 1/197, 1/198, 1/199, 1/200, 1/201, 1/202, 1/203, 1/204, 1/205, 1/206, 1/207, 1/208, 1/209, 1/210, 1/211, 1/212, 1/213, 1/214, 1/215, 1/216, 1/217, 1/218, 1/219, 1/220, 1/221, 1/222, 1/223, 1/224, 1/225, 1/226, 1/227, 1/228, 1/229, 1/230, 1/231, 1/232, 1/233, 1/234, 1/235, 1/236, 1/237, 1/238, 1/239, 1/240, 1/241, 1/242, 1/243, 1/244, 1/245, 1/246, 1/247, 1/248, 1/249, 1/250, 1/251, 1/252, 1/253, 1/254, 1/255, 1/256, 1/257, 1/258, 1/259, 1/260, 1/261, 1/262, 1/263, 1/264, 1/265, 1/266, 1/267, 1/268, 1/269, 1/270, 1/271, 1/272, 1/273, 1/274, 1/275, 1/276, 1/277, 1/278, 1/279, 1/280, 1/281, 1/282, 1/283, 1/284, 1/285, 1/286, 1/287, 1/288, 1/289, 1/290, 1/291, 1/292, 1/293, 1/294, 1/295, 1/296, 1/297, 1/298, 1/299, 1/300, 1/301, 1/302, 1/303, 1/304, 1/305, 1/306, 1/307, 1/308, 1/309, 1/310, 1/311, 1/312, 1/313, 1/314, 1/315, 1/316, 1/317, 1/318, 1/319, 1/320, 1/321, 1/322, 1/323, 1/324, 1/325, 1/326, 1/327, 1/328, 1/329, 1/330, 1/331, 1/332, 1/333, 1/334, 1/335, 1/336, 1/337, 1/338, 1/339, 1/340, 1/341, 1/342, 1/343, 1/344, 1/345, 1/346, 1/347, 1/348, 1/349, 1/350, 1/351, 1/352, 1/353, 1/354, 1/355, 1/356, 1/357, 1/358, 1/359, 1/360, 1/361, 1/362, 1/363, 1/364, 1/365, 1/366, 1/367, 1/368, 1/369, 1/370, 1/371, 1/372, 1/373, 1/374, 1/375, 1/376, 1/377, 1/378, 1/379, 1/380, 1/381, 1/382, 1/383, 1/384, 1/385, 1/386, 1/387, 1/388, 1/389, 1/390, 1/391, 1/392, 1/393, 1/394, 1/395, 1/396, 1/397, 1/398, 1/399, 1/400, 1/401, 1/402, 1/403, 1/404, 1/405, 1/406, 1/407, 1/408, 1/409, 1/410, 1/411, 1/412, 1/413, 1/414, 1/415, 1/416, 1/417, 1/418, 1/419, 1/420, 1/421, 1/422, 1/423, 1/424, 1/425, 1/426, 1/427, 1/428, 1/429, 1/430, 1/431, 1/432, 1/433, 1/434, 1/435, 1/436, 1/437, 1/438, 1/439, 1/440, 1/441, 1/442, 1/443, 1/444, 1/445, 1/446, 1/447, 1/448, 1/449, 1/450, 1/451, 1/452, 1/453, 1/454, 1/455, 1/456, 1/457, 1/458, 1/459, 1/460, 1/461, 1/462, 1/463, 1/464, 1/465, 1/466, 1/467, 1/468, 1/469, 1/470, 1/471, 1/472, 1/473, 1/474, 1/475, 1/476, 1/477, 1/478, 1/479, 1/480, 1/481, 1/482, 1/483, 1/484, 1/485, 1/486, 1/487, 1/488, 1/489, 1/490, 1/491, 1/492, 1/493, 1/494, 1/495, 1/496, 1/497, 1/498, 1/499, 1/500, 1/501, 1/502, 1/503, 1/504, 1/505, 1/506, 1/507, 1/508, 1/509, 1/510, 1/511, 1/512, 1/513, 1/514, 1/515, 1/516, 1/517, 1/518, 1/519, 1/520, 1/521, 1/522, 1/523, 1/524, 1/525, 1/526, 1/527, 1/528, 1/529, 1/530, 1/531, 1/532, 1/533, 1/534, 1/535, 1/536, 1/537, 1/538, 1/539, 1/540, 1/541, 1/542, 1/543, 1/544, 1/545, 1/546, 1/547, 1/548, 1/549, 1/550, 1/551, 1/552, 1/553, 1/554, 1/555, 1/556, 1/557, 1/558, 1/559, 1/560, 1/561, 1/562, 1/563, 1/564, 1/565, 1/566, 1/567, 1/568, 1/569, 1/570, 1/571, 1/572, 1/573, 1/574, 1/575, 1/576, 1/577, 1/578, 1/579, 1/580, 1/581, 1/582, 1/583, 1/584, 1/585, 1/586, 1/587, 1/588, 1/589, 1/590, 1/591, 1/592, 1/593, 1/594, 1/595, 1/596, 1/597, 1/598, 1/599, 1/600, 1/601, 1/602, 1/603, 1/604, 1/605, 1/606, 1/607, 1/608, 1/609, 1/610, 1/611, 1/612, 1/613, 1/614, 1/615, 1/616, 1/617, 1/618, 1/619, 1/620, 1/621, 1/622, 1/623, 1/624, 1/625, 1/626, 1/627, 1/628, 1/629, 1/630, 1/631, 1/632, 1/633, 1/634, 1/635, 1/636, 1/637, 1/638, 1/639, 1/640, 1/641, 1/642, 1/643, 1/644, 1/645, 1/646, 1/647, 1/648, 1/649, 1/650, 1/651, 1/652, 1/653, 1/654, 1/655, 1/656, 1/657, 1/658, 1/659, 1/660, 1/661, 1/662, 1/663, 1/664, 1/665, 1/666, 1/667, 1/668, 1/669, 1/670, 1/671, 1/672, 1/673, 1/674, 1/675, 1/676, 1/677, 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1/821, 1/822, 1/823, 1/824, 1/825, 1/826, 1/827, 1/828, 1/829, 1/830, 1/831, 1/832, 1/833, 1/834, 1/835, 1/836, 1/837, 1/838, 1/839, 1/840, 1/841, 1/842, 1/843, 1/844, 1/845, 1/846, 1/847, 1/848, 1/849, 1/850, 1/851, 1/852, 1/853, 1/854, 1/855, 1/856, 1/857, 1/858, 1/859, 1/860, 1/861, 1/862, 1/863, 1/864, 1/865, 1/866, 1/867, 1/868, 1/869, 1/870, 1/871, 1/872, 1/873, 1/874, 1/875, 1/876, 1/877, 1/878, 1/879, 1/880, 1/881, 1/882, 1/883, 1/884, 1/885, 1/886, 1/887, 1/888, 1/889, 1/890, 1/891, 1/892, 1/893, 1/894, 1/895, 1/896, 1/897, 1/898, 1/899, 1/900, 1/901, 1/902, 1/903, 1/904, 1/905, 1/906, 1/907, 1/908, 1/909, 1/910, 1/911, 1/912, 1/913, 1/914, 1/915, 1/916, 1/917, 1/918, 1/919, 1/920, 1/921, 1/922, 1/923, 1/924, 1/925, 1/926, 1/927, 1/928, 1/929, 1/930, 1/931, 1/932, 1/933, 1/934, 1/935, 1/936, 1/937, 1/938, 1/939, 1/940, 1/941, 1/942, 1/943, 1/944, 1/945, 1/946, 1/947, 1/948, 1/949, 1/950, 1/951, 1/952, 1/953, 1/954, 1/955, 1/956, 1/957, 1/958, 1/959, 1/960, 1/961, 1/962, 1/963, 1/964, 1/965, 1/966, 1/967, 1/968, 1/969, 1/970, 1/971, 1/972, 1/973, 1/974, 1/975, 1/976, 1/977, 1/978, 1/979, 1/980, 1/981, 1/982, 1/983, 1/984, 1/985, 1/986, 1/987, 1/988, 1/989, 1/990, 1/991, 1/992, 1/993, 1/994, 1/995, 1/996, 1/997, 1/998, 1/999, 1/1000	Canada Coals & R'y Co .....  Cumberland R'y & Coal Co..... " " Lawson Mining Co..... Londonderry Iron Co ..... Prospect Mining Co..... Styles Mining Co.....	Cumberland..  " ..... " ..... " ..... " ..... " .....	A. Dick.....  J. R. Cowan.. ..... ..... ..... ..... .....	Joggins . . .  Springhill .. ..... ..... ..... ..... ..... .....	15  30 4 1 4 2 5
					29

23/53	Milner, C	"	1
24/7, 25/9	Boston Coal Mining Co	"	2
57	Salts Spring Coal Co	"	1
26/16	Minudie Mining Co	"	1
58, 59, 60, 61	Tupper, C. H	"	4
63, 93, 0	Leckie, R. G	"	3
65	Annand, C	"	1
66, 67, 68, 69	Cowans, J. R	"	4
80	Gue, T. R	"	1
86	Rutherford, John	"	1
91	Fraser, H. R	"	1
89	Hickman, J. S	"	1
94	Weatherbe, U. J	"	1
94, 0	Hayward, A. A	"	1
			85
13/79, 1/27, 2, 3, 28, 29, 30	General Mining Assoc., ltd.	Cape Breton	23
58/67	Weatherbe, R. L	"	1
42/52, 49/53	McLeod, Hugh	"	2
45/5, 46/28, 47/29	Burns, A	"	3
50/40, 51/41, 52/42	} Dominion Coal Co., ltd.	"	3
60/54, 61/55, 62/56, 63/57, 64/58, 65/59, 66/60, 67/61, 68/62, 69/63.		"	10
108, 109, 110		"	3
111, 179, 180	Roberts, F	"	3
Carried forward			48

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.—Continued.

No. of Lease	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	No. of Sq. Miles.
112, 113, 114, 115, 117, 118	Cowans, R.....	Cape Breton.	.....	Br't forward..	48
127, 130	Fairbanks, E. C.....	"	.....	.....	6
128, 129, 134, 135, 136, 139, 144	Moseley, E. T.....	"	.....	.....	1
135.....	McKenzie, R.....	"	.....	.....	7
138, 149, 184	White, A. J.....	"	.....	.....	1
140.....	McColl, J.....	"	.....	.....	3
141, 177	Cumberland R'y & Coal Co.....	"	.....	.....	1
146.....	Tremaine, B. E.....	"	.....	.....	1
159, 160	Morrison, A.....	"	.....	.....	1
0, 0.....	East Bay Coal Co.....	"	.....	.....	2
0.....	Dunn, J.....	"	.....	.....	2
161.....	Routledge, E.....	"	.....	.....	1
164, 168	Roberts, F.....	"	.....	.....	1
169, 170, 183	McVey, Jas.....	"	.....	.....	3
178.....	Routledge, W.....	"	.....	.....	3
165.....	Stephens, L. H.....	"	.....	.....	1
163.....	Hamilton, C. F.....	"	.....	.....	1
176.....	Copeland, J. D.....	"	.....	.....	1
162.....	Dominion Coal Co.....	"	D. Mackean.	Glace Bay..	1
171, 174	Gorham, J. W.....	"	.....	.....	76
					2

175.....	McDonald, J. W.....	"	.....	.....	1
182.....	Cossitt, G. G.....	"	.....	.....	1
167.....	Murray, John.....	"	.....	.....	1
173.....	Weatherbe, R. L.....	"	.....	.....	1
					167
1/2.....	Kenny, T.....	Victoria.....	.....	.....	3
1/13.....	McGregor, J. D.....	Inverness.....	.....	.....	3
2/6.....	Ross, H. E.....	".....	.....	.....	1
3/11.....	Ross, W. J.....	".....	.....	.....	1
6/4, 7/10.....	Shannon, S. L.....	".....	.....	.....	2
0, 0.....	Gorham, J. W.....	".....	.....	.....	2
8, 9.....	Fraser, W. J.....	".....	.....	.....	2
11.....	Meagher, N. H.....	".....	.....	.....	1
19, 20.....	Smith, J. J.....	".....	.....	.....	2
15.....	Chisholm, D.....	".....	.....	.....	1
26.....	McKenzie, J. W.....	".....	.....	.....	1
18.....	Drummond, R.....	".....	.....	.....	1
0.....	McNab, William.....	".....	.....	.....	1
12, 13, 24.....	Hussey, W. P.....	".....	.....	.....	3
16.....	Jones, A. C.....	".....	.....	.....	1
17.....	McNeil, W.....	".....	.....	.....	1
23, 25.....	McColl, J.....	".....	.....	.....	2
27.....	Boston & N. S. C. Co.....	".....	.....	.....	1
1, 7, 8.....	Terminal City Co.....	Richmond.....	.....	.....	3
2.....	Columbia Coal Co.....	".....	.....	.....	1
				Carried forward	33

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.—Continued.

NO. OF LEASE.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	Sq. Miles. No. of
3.....	Reynolds, W. K .....	Richmond ..	.....	Br't forward.	33
5.....	Chisholm, Wm .....	" ..	.....	.....	1
4, 6.....	Lennoxville T. & C. Co.....	" ..	.....	.....	1
1.....	Ross, George .....	Colchester ..	.....	.....	2
					1
					38



TABLE A.—COAL TRADE BY COUNTIES, FOR THE YEAR ENDING, SEPT. 30TH, 1894.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter .....	146,756	121,808	121,877	113,704	268,639	253,459	3,057	2,648	540,329	491,619
2nd " .....	138,076	124,480	91,080	75,280	95,957	24,067	241	202	325,354	224,029
3rd " .....	132,997	121,919	118,386	105,643	346,456	312,818	4,999	4,344	602,838	544,724
4th " .....	125,920	111,143	124,649	117,412	474,383	524,429	6,762	6,386	731,714	759,370
Total.....	543,749	479,350	455,992	412,039	1,185,355	1,114,773	15,059	13,580	2,200,235	2,019,742
Year, 1893, } 9 Mos. ending Sep. 30. }	403,482	353,401	375,045	339,163	903,571	792,762	615	598	1,682,713	1,485,024

TABLE B.—COAL TRADE BY COUNTIES FOR THE YEAR ENDING SEPTEMBER 30TH, 1894.

At Work ending 26th Augt. 1893.  Losses..... " " Nova Scotia: General Sales..... Sea borne .....	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			GRAND TOTAL.
	Round. Slack.		Run of Mine.	Round. Slack.		Run of Mine.	Round. Slack.		Run of Mine.	Round. Slack.		Run of Mine.	Round. Slack.		Run of Mine.	
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
354	37,454	89,130	16,016	126,593	97,600	10,403	5,167	416	460	174,910	191,894	16,432	383,239			
	1,034	1,037	.....	39,239	2,701	185,002	46,786	7,560	4,574	229,849	51,109	7,686	288,644			
	38,488	90,167	16,016	165,832	100,301	195,405	51,953	7,976	5,034	404,759	243,006	24,118	671,883			
	97,484	35,924	39,069	12,631	1,591	28,248	3,873	2,322	512	138,875	41,578	41,391	221,844			
	.....	.....	.....	337	.....	90,025	2,017	1,069	3,926	94,288	2,017	1,073	97,378			
	.....	.....	.....	18,342	22,709	6,745	13,438	197	1,294	26,381	37,156	197	63,734			
	30,191	10,790	83,969	81,061	5,906	535,655	49,657	79,614	900	647,807	66,353	168,583	877,743			
	.....	.....	.....	.....	.....	5,526	..	.....	.....	5,526	.....	.....	5,526			
	1,914	20,026	15,312	2,050	1,009	35,316	4,210	.....	.....	39,280	25,245	15,312	79,837			
	.....	.....	.....	270	.....	1,527	.....	.....	.....	1,797	.....	.....	1,797			
Total.....	168,077	156,907	154,366	280,523	131,516	898,447	125,148	91,178	11,666	1,358,713	415,355	245,674	2,019,742			

## COAL.—SALES.

NAMES.	1st. Quarter.	2nd. Quarter.	3rd. Quarter.	4th. Quarter.	Total 1894.	Year 1893.
					Year 1894.	Year 1893.
Nova Scotia:						
Land Sales .	116,502	104,595	101,201	60,941	383,239	281,851
Sea Borne ..	104,041	19,005	66,739	98,859	288,644	186,077
Total N. S. ....	220,543	123,600	167,940	159,800	671,883	467,928
New Brunswick	59,591	50,440	47,701	64,112	221,844	195,579
Newfoundland.	34,612	5,395	21,187	36,184	97,378	42,419
P. E. Island...	17,683	.....	15,298	30,753	63,734	43,841
Quebec.....	150,599	43,231	243,998	439,915	877,743	719,805
West Indies...	123	600	4,137	666	5,526	220
United States .	8,468	763	42,936	27,670	79,837	16,099
Other Countries	.....	.....	1,527	270	1,797	33
Total.....	491,619	224,029	544,724	759,370	2,019,742	1,485,924
1893 .....	.....	.....	.....	.....	.....	.....

## COAL.—GENERAL STATEMENT.

1894,	Produce.	Sold.	Colliery Consump- tion.
1st. Quarter .....	540,329	491,619	62,334
2nd. " .....	325,354	224,029	50,581
3rd. " .....	602,839	544,724	40,572
4th. " .....	731,713	759,370	45,065
Total.....	2,200,235	2,019,742	198,552
1893 .....	1,682,713	1,485,024	143,091

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COAL PRODUCE OF NOVA SCOTIA FOR YEAR ENDING SEPT. 30th, 1894.

COLLIERIES.	Production.	SALES.			Total.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
Chignecto.....	450	274	106	.....	380	6	64
Joggins.....	91,810	64,820	16,897	.....	81,717	6,947	1,711
Springhill.....	448,728	100,229	139,904	154,366	394,499	31,352	22,067
Minudie .....	2,385	2,298	.....	.....	2,298	87	.....
Scotia .....	456	456	.....	.....	456	.....	.....
Acadia .....	235,923	131,466	73,796	.....	205,262	24,504	8,989
Intercolonial .....	220,069	149,057	57,720	.....	206,777	12,486	4,061
Dominion .....	950,683	714,051	89,462	91,178	894,691	40,777	18,980
Sydney.....	234,672	184,396	35,686	.....	220,082	12,599	12,014
Broad Cove .....	181	138	.....	.....	138	.....	23
Mabou .....	365	326	.....	.....	326	45	29
Cape Breton.....	14,513	11,202	1,784	130	13,116	1,538	273
Total.....	2,200,235	1,358,713	415,355	245,674	2,019,742	130,341	68,211

Statement of Number and Classes of men employed, etc., etc., at each Mine during the Year ended September 30, 1894.

COLLIERIES.	UNDER GROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average No. of tons per cutter.	Average tons per day per cutter.	Average tons raised per day.	Horses.		Pits worked.
	Skilled Labor.	Laborers.	Boys.	Days Labor.	Skilled Labor.	Laborers.	Boys.	Days Labor.	Skilled Labor.	Laborers.	Boys.	Days Labor.	Persons.	Days Labor.				Above.	Below.	
Joggins .....	96	85	34	55882	8	61	7	20771	13	22	...	5412	326	82065	956	3	350	6	8	271
Springhill .....	548	312	91	204205	109	180	34	69318	...	...	...	...	1274	273523	812	3	2000	12	22	224
Acadia .....	271	260	68	137112	71	137	32	68927	5	1	...	...	845	207788	870	4	...	10	11	218
Intercolonial .....	238	71	54	88776	34	81	8	131147	4	8	...	2328	493	222251	944	3	1080	9	9	289
Dominion .....	950	361	245	316473	214	360	69	145261	10	2	...	2345	2211	464079	1000	4	883	49	175	250
Sydney .....	323	46	91	113623	63	96	38	55607	...	...	...	...	657	169230	726	3	3670	7	54	259
Cape Breton .....	32	26	2	15329	14	19	1	10167	10	11	...	5241	115	30728	...	...	...	2	...	230
Broad Cove .....	5	2	...	212	1	...	...	13	...	...	...	...	8	225	...	...	...	...	...	...
Mabou .....	3	1	...	350	...	...	...	...	3	...	...	18	7	368	...	...	...	...	...	...
Total .....	2461	1164	585	981953	514	934	189	501211	45	44	...	17093	5936	1450257	...	...	...	...	...	...

COLLIERY CONSTRUCTION ACCOUNT, YEAR ENDING SEPTEMBER 30, 1894.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machinery.	Colliery Buildings.	Dwellings.	Wharves.	Prospect'g.	Railways.	Total.
Joggins .....	\$	\$ 900	\$ 900	\$10,000	\$2,000	\$ 4,800	.....	.....	.....	\$18,600
Springhill .....	.....	.....	.....	13,661	.....	.....	.....	.....	.....	13,661
Acadia .....	125	276	.....	23,096	2,635	.....	.....	.....	402	26,534
Drummond .....	.....	.....	.....	18,797	1,096	552	.....	.....	2,274	22,719
Dominion .....	8,970	1,601	16,984	8,273	96,352	.....	.....	109	1,856	134,145
Cape Breton .....	265	2,204	2,544	10,622	1,063	4,298	3,274	507	8,613	33,490
Mabou .....	.....	.....	402	.....	.....	.....	.....	.....	.....	402
Broad Cove .....	.....	.....	82	.....	.....	.....	.....	.....	.....	82
Total .....	\$9,360	\$4,981	\$20,912	\$84,449	\$103,146	\$9,650	\$3,274	\$616	\$13,145	\$249,633

## COAL.

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1872	154 092	75
1851	116,274	"	1873	264,760	"
1852	87,542	"	1874	138,336	"
1853	120,764	"	1875	89,746	"
1854	139,125	Free.	1876	71,634	"
1855	103,222	"	1877	118,216	"
1856	126,152	"	1878	88,495	"
1857	123,335	"	1879	51,641	"
1858	186,743	"	1880	123,423	"
1859	122,720	"	1881	113,728	"
1860	149,289	"	1882	99,302	"
1861	204,457	"	1883	102,755	"
1862	192,612	"	1884	64,515	"
1863	282,775	"	1885	34,483	"
1864	347,594	"	1886	66,003	"
1865	465,194	"	1887	73,892	"
1866	404,252	"	1888	30,198	"
1867	338,492	\$1 25	1889	29,986	"
1868	228,132	"	1890	50,854	"
1869	257,485	"	1891	25,431	"
1870	168,180	"	1892	13,883	"
1871	165,431	"	*1893	16,099	"
			+1894	79,837	40

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade. Philadelphia, and are probably under-estimated.

\* Nine months only.

+ NOTE.—After August 1st, 1894. duty on Round Coal 40 cents, on Culm or Slack, 15 cents.

Nova Scotia Coal Sales, 1785 to 1894 (Inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw d 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143	1848	187,643		
1793	1,926	1849	174,592		
1794	4,405	1850	180,084	1,533,798	
1795	5,320	1851	153,499		
1796	5,249	1852	188,076		
1797	6,039	1853	217,416		
1798	5,948	1854	234,812		
1799	8,947	1855	238,215		
1800	8,401	1856	253,492		
1801	5,775	51,048	1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	2,399,319
1805	10,130		1861	326,429	
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616	1864	576,935		
1809	8,919	1865	635,586		
1810	8,609	70,442	1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	463,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	4,927,339
1815	9,336		1871	596,418	
1816	8,619		1872	785,914	
1817	9,284	1873	811,106		
1818	7,920	1874	749,127		
1819	8,692	1875	706,795		
1820	9,980	91,527	1876	634,207	
1821	11,388		1877	697,665	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	7,317,430
1825			1881	1,035,014	
1826			1882	1,250,179	
1827	1883	1,297,523			
1828	1884	1,261,650			
1829	1885	1,254,510			
1830	27,269	140,820	1886	1,373,666	
1831	37,170		1887	1,519,684	
1832	50,369		1888	1,576,692	
1833	64,743		1889	1,755,107	
1834	50,813		1890	1,786,111	13,910,136
1835	56,484		1891	1,849,945	
1836	107,593		1892	1,752,934	
1837	118,942	*1893	1,485,924		
1838	106,730	1894	2,019,742		
1839	145,962	Total .....		38,404,717	
1840	101,198				
		839,954			

SUMMARY.

1785 to 1790	14,349	1841 to 1850	1,533,798
1791 to 1800	51,048	1851 to 1860	2,399,319
1801 to 1810	70,452	1861 to 1870	4,927,339
1811 to 1820	91,527	1871 to 1880	7,317,430
1821 to 1830	140,820	1881 to 1890	13,910,136
1831 to 1840	839,954		

\*Nine months only.





MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	RENFREW.						SHERBROOKE.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
October .....	..	..	..	..	..	..	3	400	16	62	30	8 0
November .....	..	..	..	40	68	..	3	450	18	105	45	10 0
December .....	..	..	..	..	..	..	2	2483	99	86	57	4 12
January .....	1	583	23	80	105	..	3	630	25	150	39	12 0
February .....	1	603	24	..	..	..	3	68	2	30	10	0 0
March .....	1	940	37	80	98	..	3	182	7	..	..	..
April .....	1	1069	42	180	76	..	2	222	8	..	..	..
May .....	1	990	39	87	23	..	2	336	13	46	34	9 0
June .....	1	835	33	150	107	..	2	1018	40	57	42	10 0
July .....	..	..	..	140	113	10	2	729	20	38	4	1 0
August .....	..	..	..	..	..	..	3	953	38	108	144	2 0
September .....	..	..	..	..	..	..	2	943	37	26	145	0 0
Total .....	..	5020	..	757	590	..	..	8414	..	708	552	16 12

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	FIFTEEN MILE STREAM.					UNIACKE.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
October.....	1	691	27	250	72	10	0	3	853	34	85	367	15	15
November.....	1	743	29	256	48	10	0	3	778	31	56	1	6	6
December.....	1	550	22	107	26	0	0	4	992	39	80	24	15	0
January.....	1	490	19	.....	.....	.....	.....	4	2077	83	110	171	8	0
February.....	1	434	17	.....	.....	.....	.....	4	2080	83	160	168	14	13
March.....	1	511	20	.....	.....	.....	.....	2	1952	38	116	138	2	0
April.....	1	477	19	.....	46	0	0	3	531	21	136	154	12	0
May.....	1	706	28	90	78	0	0	3	360	14	211	133	9	0
June.....	1	784	31	310	173	10	0	2	365	14	220	182	5	15
July.....	1	1068	42	160	107	10	0	2	182	9	150	23	0	0
August.....	1	1019	40	.....	.....	.....	.....	2	260	10	50	14	11	0
September.....	1	881	35	.....	.....	.....	.....	3	367	14	170	14	9	0
Total.....	.....	8354	.....	1173	552	0	0	.....	10797	.....	1544	1394	8	1

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	No of Mines.	WHITEBURN.										Yield of Gold.		
		Tons Crushed.										Oz.	Dwts.	Grs.
October .....	1	1798	71	964	185	3	0	2	814	32	113	64	4	0
November .....	1	1725	69	897	201	4	0	2	732	29	125	42	18	0
December .....	1	1564	62	780	195	2	0	2	2984	119	129	68	11	0
January .....	1	1641	65	776	178	19	0	2	316	12	123	61	10	0
February .....	1	1555	62	796	160	18	0	...	...	...	19	33	5	0
March .....	1	1914	76	1003	155	0	0	...	...	...	...	...	...	...
April .....	1	1806	72	907	124	0	0	...	...	...	...	...	...	...
May .....	1	1585	63	769	103	17	0	...	...	...	20	30	14	0
June .....	1	1478	59	682	90	13	0	...	...	...	20	19	0	0
July .....	1	1478	59	528	123	7	0	...	...	...	6	9	6	0
August .....	1	1509	60	623	146	10	0	...	...	...	...	...	...	...
September .....	1	1343	53	585	195	8	0	...	...	...	...	...	...	...
Total .....	...	19397	...	9310	1860	1	0	...	4846	...	555	336	8	0

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MONTAGU.						LAKE CATCHA.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
October .....	...	...	...	210	128	14	2	631	25	139	135	10
November .....	...	...	...	75	67	10	3	518	20	165	93	..
December .....	...	...	...	26	32	10	3	526	21	95	43	10
January .....	1	836	33	160	97	7	3	638	25	174	86	9
February .....	2	304	32	182	113	..	5	826	33	121	89	10
March .....	2	583	23	162	101	..	2	1127	45	222	238	9
April .....	2	441	19	130	62	..	3	1445	57	265	253	19
May .....	1	457	18	120	48	..	3	1916	76	316	295	9
June .....	1	464	18	136	152	..	3	1841	73	359	187	19
July .....	...	...	...	154	112	10	2	1378	55	315	166	18
August .....	2	10	...	177	82	—	2	968	39	17	17	18
September .....	2	51	2	157	64	..	3	708	...	199	106	15
Total .....	...	3649	...	1688	1060	11	...	12522	...	2387	1715	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	STORMONT.					SALMON RIVER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt. Grs.					Oz.	Dwt. Grs.
October .....	3	2285	91	1202	352	..	1	1185	47	350	83	..
November .....	3	2307	92	1020	437	3	1	1147	45	175	18	..
December .....	4	2172	86	10	2	18	1	955	38	300	75	10
January .....	3	980	39	...	...	..	1	925	37	117	12	..
February .....	4	1276	51	625	187	..	1	774	30	123	13	..
March .....	5	1355	54	726	168	..	1	510	20	185	23	..
April .....	3	1319	52	638	184	6	1	...	...	122	30	..
May .....	4	1202	48	648	164	13	1	...	...	95	16	15
June .....	4	1226	49	269	131	15	1	...	...	...	...	..
July .....	3	815	32	496	124	15	...	...	...	...	...	..
August .....	3	904	36	374	88	10	...	...	...	...	...	..
September .....	2	927	39	620	140	..	...	...	...	...	...	..
Total .....	...	16768	...	6628	1980	4 18	...	5496	...	1467	271	5

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	OLDHAM.						UNPROCLAIMED AND OTHER DISTRICTS.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
October .....	2	1310	52	153	113	15	5	673	26	184	157	1
November .....	2	1088	43	77	29	9	4	539	21	61	37	18
December .....	2	918	36	168	91	12	6	452	28	52	67	..
January .....	2	225	9	130	121	3	3	1154	46	58	28	7
February .....	2	82	3	111	65	9	3	718	28	30	19	3
March .....	..	..	..	59	11	15	4	913	36	138	93	17
April .....	..	..	..	55	41	4	3	356	14	68	35	19
May .....	..	..	..	86	20	4	3	373	14	6	10	..
June .....	..	..	..	80	27	15	4	360	16	13	8	..
July .....	..	..	..	62	24	9	4	1407	56	173	189	7
August .....	..	..	..	..	..	..	..	1760	70	86	62	10
September .....	..	..	..	..	..	..	..	4774	190	570	167	1
Total .....	..	3623	..	981	546	17	..	13479	..	939	876	5
						16						12

GOLD—GENERAL STATEMENT FOR YEAR ENDED SEPT. 30, 1894.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.		Total Yield of Gold.	
					Oz.	Dwts. Grs.	Oz.	Dwts. Grs.
Tangier and Mooseland .....	2	5118	2	1469	.....	7 6	464	7 ..
Caribou and Moose River .....	4	21657	3	9727	.....	5 17	2779	16 17
Renfrew .....	1	5020	1	757	.....	15 14	590	.. ..
Sherbrooke .....	3	8414	2	708	.....	17 ..	552	16 12
Fifteen Mile Stream .....	1	8354	1	1173	.....	9 9	552	.. ..
Uniacke .....	3	10797	2	1544	.....	18 1	1394	8 1
Waverley .....	1	19397	1	9310	.....	3 23	1860	1 ..
Whiteburn .....	1	4846	1	555	.....	12 3	336	8 ..
Malaga .....	2	3649	2	1688	.....	12 13	1060	11 ..
Lake Catcha .....	2	12522	3	2387	.....	14 8	1715	.6 ..
Stormont .....	5	16768	6	6628	.....	5 23	1980	4 18
Salmon River .....	1	5496	1	1467	.....	3 16	271	5 ..
Oldham .....	2	3623	2	981	.....	11 3	546	17 16
Unproclaimed and other Districts .....	5	13479	6	939	.....	18 15	876	5 12
Total .....	33	139140	....	39333	.....	.....	14980	7 13



\*COMPARATIVE STATEMENT OF COAL DELIVERIES TO ST. LAWRENCE PORTS, FOR THE  
YEARS 1891 AND 1892.

Name of Colliery.	MONTREAL.		SOREL.		THREE RIVERS.		QUEBEC.		TOTALS.	
	1891	1892	1891	1892	1891	1892	1891	1892	1891	1892
CAPE BRETON:										
General Mining Association.	40,819	75,547	26,840	1,589	4,173	9,012	24,011	30,472	95,843	116,620
Reserve .....	84,082	74,326	8,317	4,358	4,300	.....	11,212	9,419	107,911	88,103
International .....	103,969	77,758	.....	1,233	.....	.....	4,954	7,620	108,923	86,611
Caledonia .....	69,317	73,225	18,764	.....	.....	.....	940	.....	89,021	73,225
Gowrie .....	58,200	68,198	1,806	1,845	.....	.....	2,599	3,293	62,605	73,336
Glance Bay .....	53,324	43,676	.....	.....	.....	.....	412	1,723	53,736	45,399
Gardiner .....	.....	.....	.....	.....	.....	.....	.....	5,521	.....	5,521
PICOU:										
Intercolonial .....	40,420	79,155	.....	4,566	.....	.....	276	.....	40,697	83,721
Vale and Acadia .....	4,193	.....	.....	.....	.....	.....	.....	.....	4,193	.....
FOREIGN:										
Scotch .....	15,193	23,236	.....	3,103	.....	.....	11,078	12,395	26,271	38,734
English .....	5,282	6,190	.....	.....	.....	.....	7,844	5,177	13,126	11,367
American Bituminous .....	.....	3,450	.....	.....	.....	.....	.....	.....	.....	3,450
	474,799	542,761	55,727	16,694	8,473	9,012	63,326	75,620	602,325	626,087

RECAPITULATION.

	Tons.		Tons.		Tons.	
1885 .....	1887	1888	1889	1890	1891	1892
360,000	.....	.....	482,103	517,539	467,526	602,325
377,500	.....	.....	.....	.....	543,656	626,087
* Canadian Mining Review.						

\* ST. LAWRENCE COAL DELIVERIES, 1893-94.

As customary, on the close of St. Lawrence navigation, we are able, by courtesy of the Customs officers and agents of the companies, to provide our readers with an authentic comparative statement of the coal deliveries for the past season. The total quantity received is the largest in the history of the trade, the figures for previous years, since 1885, being: 1885, 360,000 tons; 1886, 377,500 tons; 1887, 482,103 tons; 1888, 517,539 tons; 1889, 467,525 tons; 1890, 543,656 tons; 1891, 602,323 tons; 1892, 626,087 tons; 1893, 737,891 tons, and in 1894, 796,282 tons. In comparing the returns of the companies we find the Dominion Coal Co., Ltd., with an increase over last year of 55,670 tons, while the General Mining Association and the Intercolonial Coal Co., show a decrease of 20,056 tons and 2,928 tons respectively.

COMPANY.	MONTREAL.		SOREL.		THREE RIVERS.		QUEBEC.		TOTALS.	
	1893	1894	1893	1894	1893	1894	1893	1894.	1893	1894
General Mining Association Ltd.....	75195	74859	11494	8485	9218	3952	33500	22555	129407	109351
Dominion Coal Co., Ltd .....	466005	512269	5191	3151	.....	5529	18087	24004	489283	544953
Intercolonial Coal Co., Ltd .....	72079	69151	.....	.....	.....	.....	.....	.....	72079	69151
Scotch, English, Welsh and American bituminous .....	36074	55849	1528	1932	.....	.....	9520	15877	47122	73658
	649353	711628	18213	13568	9218	9481	61107	62436	737891	797113

## INTERCOLONIAL RAILWAY.

Statement shewing the various kinds of Coal (in tons) received from the different Mines for the use of the Intercolonial Railway during the year ended the 30th September, 1894.

MONTH.	Canada Coal & Railway Co., "Joggins."		River Hobert Mining Co.		Cumberland Ry. & Coal Co. "Springhill."			Acadia Coal Co. "Albion and Vale."			Intercolonial Coal Min. Co. "Drummond."		Dominion Coal Co.		General Mining Association.		REMARKS.
	Round.	Round.	Round.	Round.	Round.	Black.	Nut.	Round.	Black.	Coke.	Round.	Round.	Round.	Black.	Round.	Black.	
October, 1893	1826				7889	695		3661	103		1603		579				
November	1243	83			4672	610		3084	40	16	1654		531	180			
December	2044	227			5701	1282		3671	42		3423		664				
January, 1894	3594	382			6304	1646		4908	20		1956		769				
February, "	2578	73			7134	583	602	2441	39		2873		838				
March, "	2724	486			10136	1843		1001	58		1577		763				
April, "	1513	154			8859		352	1493	106		2583		480				
May, "	1756				4874			2403	17		2372		806				
June, "	519				8523			2515	15		3506		285				
July, "	963				3258			1287	28		378						
August, "	769				7988		1110	2443	64								
September, "	581				5487		304	2798	40				340		207		
	21010	1345			80825	9075	2367	32776	572								

## MISCELLANEOUS RETURNS.

### IRON ORE.

	Tons.
Pictou Charcoal Iron Co .....	13,655
New Glasgow Iron Coal & Ry. Co .....	38,979
Londonderry .....	9,214
Torbrook .....	21,664
	<hr/> 83,512

### MANGANESE.

	Tons.	Value.
Truro .....	14	\$701.00
Walton .....	10	675.00

### SAND, Etc.

	Tons.	Value.
Silica Co., Inverness Co. ....	76	\$725.00

### BUILDING, STONE, Etc.

	Tons.	Value.
Antigonish .....	17	\$64.00
Wallace .....	1462	23009.00

### GRINDSTONES, Etc.

	Tons.	Value.
River Hebert .....		\$6581.00

### GYPSUM.

	Tons.	Value.
St. Anne .....	950	\$900.00
Windsor .....	80006	80006.00
Cheverie .....	18205	10287.00
Walton .....	7010	6336.00

Total, 106,171 \$97,529.00

## INTERCOLONIAL RAILWAY.

*Statement shewing the number of Tons of Coal received at the following Stations, from the Mines in Nova Scotia, during the year ended the 30th September, 1894.*

Destination.	No. of Tons.	Destination.	No. of Tons.
Halifax .....	54,818 $\frac{3}{4}$	Londonderry .....	31,271
Bedford .....	723 $\frac{3}{4}$	Greenville .....	18
Windsor Junction ..	10,709 $\frac{3}{4}$	Oxford Junction ...	6
Wellington .....	88	Oxford .....	604 $\frac{1}{2}$
Enfield .....	326	Pugwash Junction ..	12
Elmsdale .....	240 $\frac{1}{4}$	Pugwash .....	509
Milford .....	66	Wallace .....	212
Shubenacadie .....	490	Tatamagouche .....	341
Stewiacke .....	699 $\frac{1}{2}$	Denmark .....	102
Brookfield .....	90 $\frac{1}{4}$	River John .....	405 $\frac{3}{4}$
Truro .....	11,412 $\frac{3}{4}$	Scotsburn .....	441
Valley .....	12	Pictou .....	7,214 $\frac{1}{2}$
West River .....	77	Spring Hill .....	16
Glengarry .....	18	Athol .....	18
Hopewell .....	1,597	Maccan .....	12
Ferrona Junction ...	87,370 $\frac{1}{2}$	Nappan .....	72
Stellarton .....	10,161	Amherst .....	10,212
New Glasgow .....	6,866	Aulac .....	241
Trenton .....	34,613	Sackville .....	3,156
Pictou Landing ....	51,605	Dorchester .....	1,018
Merigomish .....	162	Memramcook .....	499 $\frac{1}{2}$
Avondale .....	58	Painsec Junction ...	6
James River .....	22	Shediac .....	276
Antigonish .....	2,545 $\frac{1}{4}$	Point du Chene ....	78
South River .....	24	Moncton .....	22,576 $\frac{1}{2}$
Heatherton .....	58	Salisbury .....	1,176
Bayfield .....	23	Petitcodiac .....	564 $\frac{1}{2}$
Tracadie .....	94	Penobsquis .....	261
Harbor au Bouche ..	75	Sussex .....	263
Mulgrave .....	1,598	Apohaqui .....	12
Orangedale .....	11	Norton .....	41
Grand Narrows ....	227	Bloomfield .....	24
Boisdale .....	11	Hampton .....	215 $\frac{1}{2}$
North Sydney .....	7	Rothsay .....	114
Leiches Creek .....	55	Coldbrook .....	4,037
Belmont .....	82	St. John .....	3,231
Debert .....	18	Harcourt .....	12
East Mines .....	30	Kent Junction .....	502

INTERCOLONIAL RAILWAY—*Continued.*

Destination.	No. of Tons.	Destination.	No. of Tons.
Chatham Junction..	2,871½	Isle Verte .....	6
Derby Junction .....	24	St. Arsene .....	18
Newcastle .....	30	Riv. du Loup .....	2,024½
Gloucester Junction .	542	St. Henri.....	10,660½
Bathurst .....	59	Chaudiere .....	74,680
Petite Roche.....	6	Levis .....	612
Jacquet River.....	6	G.T.Ry. via Chaud're.	18,900½
New Mills .....	12	C. P. R. via St. John.	7,908½
Charlo .....	6		
Dalhousie Junction .	41	Total .....	483,302
Dalhousie .....	6		
Campbellton .....	17	Forward from	
Metapedia .....	948	Stellarton .....	210,458
Amqui .....	6	Westville.....	16,485
Little Metis .....	6	New Glasgow.....	29,113½
St. Octave .....	12	Sydney .....	13,621
Ste. Flavie .....	18	Spring Hill.....	196,704
Rimouski.....	12	Macan .....	26,920½
Bic .....	6		
St. Blois .....	6	Total .....	483,302

*Annual Statement of Ore Mined, September 30th, 1893, to  
September 30th, 1894, by the Pictou Charcoal-  
Iron Co., Ltd., Bridgeville, N. S.*

1893.		Long tons.	
Oct.	Mined and Shipped .....		1466.8
Nov.	" " .....		1567.8
Dec.	" " .....		1087.5
1894			
Jan.	" " .....		357.3
Feb.	" " .....		697.7
March	" " .....		947.5
April	" " .....		799.5
May	" " .....	1077.0	
	" and used in Furnace .....	51.8	
		—	1128.8
June	" " Shipped .....	583.0	
	" " used in Furnace .....	655.0	
		—	1238.0
July	" " Shipped .....	729.0	
	" " used in Furnace .....	631.0	
		—	1360.0
Aug.	" " Shipped .....	917.5	
	" " used in Furnace .....	640.0	
		—	1557.5
Oct.	" " Shipped .....	812.6	
	" " used in Furnace .....	634.0	
		—	1446.6
Total number of tons..		(2240) mined.	13,665.0

ERNST A. SJOSTEDT,  
*Manager.*

PICTOU CHARCOAL-IRON Co.

Average number of men employed at the mine about 50, (including 2 foreman, 2 timbermen, 3 boys and 43 miners and helpers;) average number of days labor per man and month 25.

## MINES REPORT.

### MISCELLANEOUS RETURNS.

returns show the number of men employed at the  
the New Glasgow Iron Coal and Railway Co., during  
and the number of days work performed above and

	ARISAIG. Antigonish Co.	EAST RIVER. Pictou Co.
.....	1,376	37,603
low ground..	4	255
.....	240	24,383
above ground..	50	104
.....	3,890	12,109

### TORBROOK IRON COMPANY, LTD.,

Torbrook, Annapolis Co., N. S.

RESULTS FOR YEAR ENDING SEPT. 30TH, 1894.

	Above Ground		Underground		No. of Shafts	Amt. of Ore.	
	Men.	Days.	Men.	Days.		Lg. Tons.	Cwt.
.....	17	494	68	671	■	.....	.....
.....	16	425	51	799	3	.....	.....
.....	19	515	55	1095	3	.....	.....
.....	20	570	55	1195	3	.....	.....
.....	21	568	53	1066	3	.....	.....
.....	22	643	52	1142	3	.....	.....
.....	24	577	55	702	3	.....	.....
.....	26	645	54	1099	3	.....	.....
June .....	25	607	53	1179	■	.....	.....
July .....	24	91	53	91	3	.....	.....
August .....	11	67	.....	.....	.....	.....	.....
September .....	11	266	■	388	1	.....	.....
						21,664	1300

J. S. LECKIE,  
Manager Torbrook Iron Co.



## LONDONDERRY IRON CO.

## EAST MINES.

1893.	OVERGROUND.				UNDERGROUND.			
	Skilled Men.	Days.	Unskilled Men.	Days.	Skilled Men.	Days.	Unskilled Men.	Days.
October.....	1	34	1	12	3	46	3	46
November ...	1	24	1	24	2	42	2	42
December....	1	24	1	23	3	49	2	18
1894								
January.....	1	24	1	26	3	32	3	32
February....	1	24	1	24	4	60	4	60
March.....	1	24	1	26	5	102	5	102
April.....	1	24	1	23	3	45	3	45
May.....	1	24	1	27	3	50	2	36
June.....	1	24	1	27	3	64	3	64
July.....	..	..	..	..	..	..	..	..
August.....	..	..	..	..	2	28	1	24
September ...	1	24	..	..	2	34	1	16

Ore mined to September 30th, 1894, 642 tons.

## THE LONDONDERRY IRON CO'Y., LTD.,

Acadia Mines, N. S., Nov. 22nd., 1894.

By G. R.

## WEST MINES.

1893.	OVERGROUND.				UNDERGROUND.			
	Skilled Men.	Days.	Unskilled Men.	Days.	Skilled Men.	Days.	Unskilled Men.	Days.
October.....	1	3	1	105	17	295	11	122
November ...	1	16	6	122	18	405	6	125
December....	1	22	5	73	14	290	9	163
1894.								
January.....	..	..	5	104	14	181	13	135
February....	..	..	6	123	14	302	20	304
March.....	..	..	4	118	23	592	17	285
April.....	..	..	7	229	15	286	21	457
May.....	1	27	5	156	17	362	29	538
June.....	1	27	9	172	15	311	29	355
July.....	..	..	..	...	..	...	..	...
August.....	..	..	..	...	7	30	..	...
September ...	..	..	..	...	20	474	5	108

Ore mined to September 30th, 1894, 8,572 tons, 3 cwt.

## THE LONDONDERRY IRON CO'Y., LTD.,

Acadia Mines, N. S., Nov. 22nd., 1894.

By G. R.

LANARK LIMESTONE QUARRY.

	OVERGROUND.			
	Skilled Men.	Days.	Unskilled Men.	Days.
1893.				
October.....	1	13	2	18
November .....	..	..	16	210
December .....	..	..	16	184
1894.				
January .....	..	..	18	302
February .....	..	..	27	295
March .....	..	..	35	353
April .....	..	..	22	355
May .....	..	..	33	534
June .....	..	..	13	52
July .....	..	..	..	...
August .....	..	..	..	...
September .....	..	..	..	...

Limestone quarried to September 30th, 1894, 8893 tons.

THE LONDONDERRY IRON CO'Y., LTD.,

Acadia Mines, N. S., November 31st, 1894.

*Statement of Articles the Produce of Canadian Mines, Exported from Halifax, for the year ending 30th June, 1894.*

ARTICLES.	QUANTITY.	VALUE, \$
Asbestos .....tons	93	\$ 6402
Coal .....	45340	140410
Gold in Bars .....	.....	279697
Gold, Nuggets, Quartz.....	.....	45
Gypsum .....	38½	420
Oil Coal or Kerosine.....galls.	1198	248
Manganese.....tons.	14¾	1540
Platinum .....	2791	2372
Total, the Produce of Canada.	.....	\$431134

REPORT

OF THE

★  
DEPARTMENT OF MINES,

NOVA SCOTIA,

FOR THE YEAR ENDING SEPTEMBER 30, 1895.

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HALIFAX, N. S.:  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER,  
1896.

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WM. MACNAB, PRINTER, 8 PRINCE ST., HALIFAX.

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REPORT  
OF THE  
DEPARTMENT OF MINES,  
NOVA SCOTIA,  
FOR THE YEAR ENDING SEPTEMBER 30, 1895.

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HALIFAX, N. S.:  
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER,  
1896.

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# DEPARTMENT OF MINES.

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REPORT FOR THE YEAR ENDING SEPTEMBER  
30, 1895.

---

*To His Honor MALACHY BOWES DALY, Esquire, Lieutenant-Governor  
of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient Servant,

CHARLES E. CHURCH,

*Commissioner of Public Works and Mines.*

HALIFAX, *December 6th, 1895.*



# REPORT

## ON THE

# MINES OF NOVA SCOTIA,

By EDWIN GILPIN, JR., A. M., F. G. S., LL. D.,

FELLOW OF THE ROYAL SOCIETY OF CANADA.

OFFICE OF INSPECTOR OF MINES,

HALIFAX, *December 4th, 1895.*

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

*Commissioner of Public Works and Mines:—*

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia for the year ending September 30th, compared with that for the year ending September 30th, 1894:—

	Year ending Sep. 30, 1894.	Year ending Sep. 30, 1895.
Gold . . . . .	19,980	22,112
Iron Ore . . . . .	83,512	79,636
Manganese Ore . . . . .	24	110
Coal raised* . . . . .	2 200,235	2,089,245
Coke made* . . . . .	59,638	41 497
Gypsum† . . . . .	106,171	133,300
Grindstones‡ etc . . . . .	6,581	17,189
Limestone . . . . .	30,000	30,176
Copper Ore . . . . .	.. ..	.. ..

\*Ton of 2,240 lbs.

†Amount exported.

‡Value in dollars.

---

During the past season, owing to delays in the appointment of instructors, no examination was held for granting certificates to enginemen. It is expected that the Schools of Instruction will shortly be started and examinations held before the spring. An examination was held last spring for granting certificates to managers, underground managers and overmen. None of the candidates for managers' certificates passed. The following received certificates as underground managers :—

Chas. Rennie, Springhill.  
 W. K. Munro, Westville.  
 Dan. McNeil, "  
 Jas. H. Quigley, "

The following received certificates as overmen :

Geo. Williams, Stellarton.  
 Rory Campbell, do.  
 John T. Morrison, Westville.  
 John D. Keith, do.  
 J. D. Maxwell, do.  
 John Gray, do.  
 Edwin P. White, do.  
 John Long, Thorburn.  
 A. G. McLeod, do.  
 James Murphy, Springhill.  
 R. J. McDonald, do.  
 James P. McNeil, do.  
 John McDonald, Cow Bay.  
 D. K. McVicar, do.  
 John Ferguson, do.

In September an examination was held for managers, and the following passed :

Malcolm Blue, Springhill.  
 A. B. Wilson, do.  
 J. J. McKenzie, do.  
 Thomas Blackwood, Jogging.  
 Henry McCarther, do.  
 Thomas J. Brown, Victoria.

Reference was made in my last report to the samples of Nova Scotia minerals being prepared for the Nova Scotia Court of the Imperial Institute, London.

The following list shows the samples forwarded, which have proved satisfactory to the Institute authorities.:

## Box No. 1.

Coal—Westville, Pictou Co., Intercolonial Coal Co.  
 " Joggins, Cumberland Co., Canada Coal & Ry. Co.  
 Marble—Walton, Hants Co., W. Macnab.  
 Red Ochre—Truro, Colchester Co.  
 Brown Hematite—Dean Settlement, Halifax Co.  
 Red Hematite—Clifton, Colchester Co.  
 " Newton Mills, do.  
 Barytes—Stewiacke, do.  
 2 Gypsum—Halifax Co.  
 4 Clays—do.  
 Umber—Truro, Colchester Co.  
 Manganese Ore—Truro, do.  
 Brown Hematite—Springville, Pictou Co.  
 Bog Iron Ore—Ingonish, Victoria Co.  
 Brown Hematite—St. Mary's, Guysboro Co.  
 Magnetite—St. George's R., Cape Breton Co.  
 Fire Clay—Stellarton, Pictou Co., Acadia Coal Co.  
 " (ground) do. do.  
 Manganiferous Hematite—East River, Pictou Co., New Glasgow,  
 I. C. & Ry. Co.  
 Red Hematite—Blanchard, Pictou Co., do.  
 " do. do. do.  
 No. 3 Foundry Pig—Ferrona, do. do.  
 Coke—do. do.  
 Bessemer Hematite Pig—do. do.  
 No. 1 Foundry Pig—do. do.  
 Brown Hematite—Bridgeville, do. do.  
 Country Rock—Torbrook, Annapolis Co., Torbrook Iron Co.  
 Red Hematite—do. do. do.  
 Specular Ore—East River, Pictou Co.  
 Magnetite—Torbrook, Annapolis Co., J. H. Hall.  
 " Nictaux, do. do.  
 " do. do. do.  
 Shell Ore—do. do. do.

## Box No. 2.

Specular Iron Ore—Bridgeville, Pictou Co., New Glasgow, I. C. &  
 R'y Co.  
 No. 2 Foundry Pig—Ferrona, do. do.  
 Gray Forge Pig, do. do. do.  
 Red Hematite—Sutherland's River, Pictou Co., S. H. Holmes.  
 Manganese Ore—Bridgeville, Pictou Co., New Glasgow I C. & R'y Co.  
 Antimony Ore—Rawdon, Hants Co.  
 Brown Hematite—Black Rock, East River, Pictou Co.  
 Micaceous Iron Ore, do. do.  
 Manganese Ore—Near Truro, Colchester Co.  
 2 samples Manganese Ore—Tennycap, Hants Co., J. L. Jennison.

Red Hematite—Grand Lake, Halifax Co.  
 Manganese Ore—Near Tennycape, Hants Co.  
 Coke—Sample to go with Coke in Box No. 8.  
 Auriferous Quartz with Mispickel, etc.—Montagu, Halifax Co.  
 Manganese Ore—Tennycape, Hants Co.  
 " Walton, do.  
 Specular Ore—East River, Pictou Co., S. H. Holmes.  
 Manganese Ore—West Branch, East River, Pictou Co.  
 " Cheverie, Hants Co.  
 Micaceous Iron Ore—East River, Pictou Co., S. H. Holmes.  
 Lead Ore—Smithfield, Hants Co., G. E. Francklyn.  
 2 Fire Brick—Acadia Coal Co., Stellarton, Pictou Co.  
 Red Hematite—Canaan Mtn., Annapolis Co., J. H. Hall.  
 Limestone—Nictaux Falls, Annapolis Co., do.  
 Magnetite—Bents, Nictaux do. do.  
 Brown Hematite—Londonderry, Colchester Co., Londonderry Iron Co.  
 Ankerite—do. do.  
 Brown Hematite—do. do.  
 Spathic Iron Ore—do. do.  
 Specular Ore—East Mines do. do.  
 Brown Hematite—W. Mines, do. do.  
 " do. do.  
 " E. Mines, do. do.  
 Red Hematite—Torbrook, Annapolis Co., Torbrook Iron Co. for mixture at Londonderry, Col. Co.

## Box No. 3.

Coal—Stellarton, Pictou Co., Acadia Coal Co.  
 Sample Building Stone.  
 Coal—Sydney, Cape Breton, General Min. Asstn.  
 Ankerite and Spathic Ore—Londonderry, Colchester Co., Londonderry Iron Co.  
 Magnesian Iron Ore—do. do. do.  
 Specular and Spathic Ore—do. do. do.  
 Brown Hematite—West Mines, do. do. do.  
 Limonite—" do. do. do.  
 " Manganiferous—" do. do. do.  
 Spathose Ore with Vein Rock—do. do. do.  
 Sample Limonite—do. do. do.  
 " do. do. do.  
 Specular Ore and Felspar—do. do. do.  
 Ankerite—East River, Pictou Co., S. H. Holmes.  
 Brown Hematite—East River, Pictou Co., S. H. Holmes.  
 Fibrous Hemonite, Sample—Londonderry, Colchester Co.  
 Limestone—Brookfield, Colchester Co. Flux used at Londonderry.  
 Specular and Limonite—Londonderry, Colchester Co.  
 Specular Ore—St. Peter's, Cape Breton.  
 Brown Hematite—Sutherland's River, Pictou Co.  
 Specular Iron Ore—Lochaber, Antigonish Co.  
 Limestone—Brookfield, Colchester Co.

### Samples Building Stone.

## Samples Building Stone.

## Samples Building Stone.

## Samples Building Stone.

**Box No. 8.**

**Sample Building Stone—Wallace, Cumberland Co.**

Sample Washed and Unwashed, Slack—New Glasgow I. Co. & R'y.  
Co., Ferrona, Pictou Co.

**Sample Coke—N. G. I. Co. & R'y. Co., Ferrona, Pictou Co.**

**Red Hematite—Fall Brook, Pictou Co., S. H. Holmes.**

**Brown Hematite—Brookfield, Hants Co.**

### Specular Iron Ore—St. Peter's, Cape Breton.

**Manganiferous Iron Ore—Cameron Mine, East River, Pictou Co.:**

" The Gore, Hants Co.

## Copper Pyrites—Coxheath, C. Breton Eastern Develop. Co.

do. do. do.

### Brown Hematite—Shubenacadie, Hants Co.

"                      **Lochaber, Antigonish Co.**

## Manganese Ore—Stephen's Mine, Tennycape, Hants Co.

**Brown Hematite—Bridgeville, Pictou Co., to 90 in Box 10, exhibit of Pictou Charcoal Iron Co.**

**Box No. 9.**

**Samples of Steel made from Nova Scotia Iron Ores—Nova Scotia Steel Co., Trenton, Pictou Co.**

**Box No. 10.**

**Exhibit of Ores, Fluxes, etc.—Pictou Charcoal Iron Co., Bridgeville,  
Pictou Co.**

**Box 11, 12, 13.**

## Pictures illustrating Nova Scotia Scenery.

**Box No. 14.**

**Copper Pyrites with Galena, carrying gold and silver, Junction Carboniferous and Silurian (?)—Ohio, Antigonish Co., F. H. Mason.**

**Nodules Iron Pyrites, Permo-carboniferous—Waugh's River, Colchester Co., F. H. Mason.**

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Copper Pyrites and Micaceous Iron Ore, Devonian—Lochaber, Antigonish Co., F. H. Mason.

Copper Pyrites, Devonian—College Grant, Antigonish Co., F. H. Mason.

Copper Pyrites and Spathic Iron Ore, Devonian—Polson Lake, Antigonish Co., F. H. Mason.

Sulphuride of Copper and Carbonate, Permo-carboniferous—Waugh's River, Colchester Co., F. H. Mason.

Magnetite—Digby Neck, Digby Co.

10 specimens Quartz and other minerals from Triassic Trap, North Mountain, Nova Scotia.

17 do. do.

7 specimens Metallic Copper from trap and volcanic ash—North Mountain Triassic Trap.

Barytes—Stewiacke, Colchester Co., Carboniferous.

Clay Ironstone—Maccan, Cumberland Co., Upper Carboniferous.

Mountain Leather—Sugar Loaf, Cumberland Co.

Manganese Ore—St. Peter's, Cape Breton.

Antimony Ore—Kennetcook, Hants Co.

Lead Ore—Arichat, C. B., Devonian.

Limonite—Brookfield, Colchester Co., Carb. Lower.

Red Hematite—Old Barns, Colchester Co. do.

Do. do.

Magnetite—Kempton, Colchester Co., Devonian (?)

Red Hematite—Webster's Mt., Pictou Co., Upper Silurian.

Bedded Red Hematite—Webster's Mt., Pictou Co., Upper Silurian.

11 Specimens Gypsum—Lower Carb.

Lead Ore—Arichat, Cape Breton, Devonian.

Box 15.

Mineral map of Nova Scotia.

Box 16.

Photos N. S. Scenery.

Box 17.

Photos N. S. Scenery.

Box 18.

3 Samples N. S. Granite—Nictaux, Annapolis Co.

10 Specimens Gold Quartz, 1 Sample Coal—Acadia Coal Co. Stellarton, Pictou Co.

1 Box Samples Specular Iron Ore forwarded by S. H. Holmes in response to enquiry made per Curator, Can. Sec. Imperial Institute.



## COAL TRADE.

The coal trade returns for the twelve months ended September 30th, as compared with the fiscal year 1894, are as follows:—

	1894.	1895.
Nova Scotia.....	671,883 Tons.	633,041 Tons.
New Brunswick.....	221,844 "	228,525 "
P. E. Island.....	63,734 "	81,492 "
Newfoundland.....	97,378 "	63,232 "
Quebec.....	877,743 "	740,098 "
West Indies .....	5,526 "	11,872 "
United States.....	79,837 "	73,097 "
Other Countries .....	1,707 "	.....

These sales show decreases in the business at home, and with Newfoundland, Quebec, United States, etc., and slight increases in those to New Brunswick, P. E. Island, and the West Indies. I am aware of no special reason for the decrease in the coal trade during the past season. There have been no disturbances of trade, and wages and freight have remained practically unchanged. The general quiet in business is presumably the cause, at the date of writing, however, business at the mines is taking a shape promising better for the ensuing year.

## CUMBERLAND COUNTY.

In Cumberland County the sales amounted to 422,210 tons, compared with 479,350 tons in 1894. The production of Springhill was 381,032 tons, and of the Joggins 110,082 tons. The output of the other mines remained unimportant.

At the Springhill mines a very disastrous fire occurred in the early part of the year. It destroyed the west and north Bank Heads as well as the covered trestle connecting them. By the end of the year, however, a new bank head has been built at the north slope. The west slope has been utilised for timber, men, etc. After the fire room was found in the east slope workings for many of the men, and much of the coal above the 1900 feet levels left standing in pillars, etc., has been taken out.

The Canada Coals and Railway Company's operations do not present many new points of interest during the past season. The No. 3 slope equipment has been completed, &c.

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PICTOU COUNTY.

The sales were 368,784 tons, as compared with 412,039 tons in 1894; the sales to Quebec being 85,250 tons, as compared with 86,961 tons in 1894.

The idleness of the blast furnaces during the year contributed materially to the lessened sales of this county.

Only two companies were in operation, the Acadia producing 206,798 tons, and the Intercolonial 209,538 tons.

Operations at the Acadia Coal Company's Acadia colliery were retarded by a fire, which destroyed the bank head. It has been rebuilt and the customary operations resumed.

I append here a memo on this fire, as well as on that at Springhill, furnished me by Mr. Maddin, Deputy Inspector:—

WESTVILLE, Dec. 27th, 1894.

EDWIN GILPIN, JR., ESQ.,

*Inspector of Mines, Halifax, N. S.:*

DEAR SIR,—I am sorry to report two very destructive fires which occurred within the last two months. The first was at the Acadia Mine on November 20th. It started at 7.30 p. m. in a portion of the bankhouse which was reserved for repairing boxes, and I am informed that there was no fire used in the building for three or four days previous to the fire. There were several barrels of water in the building, and a good force pump with rubber hose attached, but the building was so old and greasy that once on fire it was utterly impossible to save it. The bank house, the engine house, the boiler shed and several smaller buildings were destroyed, and it was only after a well-fought battle with two or three hundred men that the slope was saved. The engine and boiler house, were built of brick and stone with iron roofing, so that comparatively little damage was done to the engine or boilers.

The next fire which I have to speak about took place on December 19th at Springhill Mines. At 5.45 a. m. a fire started in the west bank house. The west and north slope bank houses are connected by a trestle some 600 feet in length and 50 feet high; this, with the two bank houses attached, would make a total length of about 900 feet. Now these buildings were well equipped for fire, having two inch pipes running the full length of the trestle with nipples and valves every 90 or 100 feet, and a coil of rubber hose hung at each valve; then there were buckets hung along the inside of the building, and on the floor there were a large number of barrels of water, and at each end of the trestle there was a force pump to attach to the pipes in the building. No fire was used in these

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buildings, they being heated by steam. They were also lighted by electricity, but the lights were turned off for some 10 hours before the fire was discovered. Strange to say, with all these appliances for fighting fire, and the assistance of a chemical engine belonging to the town, the whole structure, with the north engine and boiler houses, an endless chain engine, an engine for running the revolving screens, two sets of elevators, and 5 coal bins which have a capacity for three or four hundred tons, were totally destroyed, and I need not tell you that it was with a well-governed fight, that the west engine house and boilers were saved.

Much credit is also due the men of Springhill in saving the mines from the destruction of the flames. The loss to the Cumberland Coal and Railway Company will be in the vicinity of seventy or eighty thousand dollars.

I will also mention another fire which is worthy of some consideration. On December 19th, at about 5 p. m., a fire started in the machine shop at the Drummond Colliery. There was a box in the shop, which was partly filled with saw-dust, and was used for catching the drippings from the oil cans, which sat on a shelf right over the box. Some cotton waste got gathered in the box among the saw-dust and oil, and this is where the fire originated. The shop is lighted by electricity, and the lights were burning when the fire was seen, and the men working close by noticed the fire, and immediately tore the box, with its contents, out of the building before any damage was done. No one knows what started the fire in the box.

Some twelve years ago the cotton waste at the Drummond Colliery was kept in a barrel, in the car shed, to be used in the grease boxes of the cars. One night the watchman noticed a light, and upon going to see the cause of it, he found the barrel of waste on fire. and he only got there in time to save the car shop from being destroyed.

I mention these last fires as cases of spontaneous combustion, and as pointing to the necessity of mine managers exercising every caution in the preservation of the valuable properties and interests entrusted to them. Experience has shown that engine-houses should not be built of combustible materials, and that they should be set well away from bank heads, grease hovels, etc.; that bank head trestles should be built of iron on stone instead of wood.

I remain yours truly.

W. MADDIN, JR.,  
*Dy. Inspector.*

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Operations in the main seam to the west and north of the Foster pit were conducted through stone drifts from the Cage and Third seams, but were abandoned, as the coal did not prove merchantable. During the summer a commission appointed by your Honorable Government took a large amount of evidence bearing on the history, causes, and effects of the fires in the Pictou coal seams. The enquiry was confined to the Vale and Albion areas. From the information elicited a report will be prepared and submitted.

At the Intercolonial Colliery many improvements have been effected, which will be found described by Mr. Maddin in his report.

I am not aware that any other work or prospecting was done in this district during the past year.

I beg to submit herewith the report of W. Maddin, Jr., Esq., Deputy Inspector :—

WESTVILLE, N. S., Oct. 4, 1895.

E. GILPIN, ESQ.,

*Dep. Commissioner and Inspector of Mines :*

DEAR SIR,—I have the honor to submit to you herewith a condensed report on the various mines in the districts of Pictou and Cumberland Counties up to the 30th day of September, A.D., 1895 :

ACADIA MINES, WESTVILLE, PICTOU COUNTY.

In describing the work carried on at this mine last year, I stated that in all probability the 3600 feet lift would be worked out during the current season. This has been successfully accomplished and the plant transferred to the 4000 feet lift. The hoisting slope and travelling way from the 3000 feet lift to the 4000 feet lift are supported on wooden packs placed along each side. It has also been found necessary to extend the packs or butts in both hoisting slope and travelling way up to the 3000 feet lift. The pressure is so great it seems that timber placed in any way other than on packs or butts is unable to sustain the pressure. The return airways are, from the same cause, giving a good deal of trouble to maintain them in a satisfactory condition. The south side level on this lift has now been driven 2490 feet, and on this side the pitch of the coal has become so flat the coal will not run down in shoots. It has therefore become necessary to run roads up hill. On account of this and other difficulties the management at the time of building the new bankhead reduced the size of the pit boxes considerably so as to suit the changed conditions of operations in the mine, thus making the boxes much easier to handle in up hill places, and also affording better opportunities to keep the roads open. This lift is all worked longwall, necessitating roads to be kept open in the broken ground. I consider the change in the size of the boxes to be of material benefit for all concerned.

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The north side level is in 2000 feet, and on this side the coal is run down in shoots the pitch of the coal being steeper than on the south side. The second shoot is almost driven through, and it is intended to commence work at the third one right away. When the level was in 1800 feet they struck a fault (down throw) and had to strip 60 or 70 feet of stone before the coal was obtained. No explosives were used in this work. They have a considerable amount of gas to contend with. On the 20th of November, 1894, the bank house and connections were destroyed by fire, thereby causing the mine to be idle for 2 or 3 months. A temporary engine was erected to assist in making repairs, &c., until the main engine was repaired and a new bank house built. The new bank house is equipped with the latest improvements in the way of automatic cages and tipples. The coal is taken from the slope mouth to bank-head by automatic cages and the empty boxes returned by the same means to the slope mouth.

THIRD SEAM CAGE PIT SEAM AND FORD PIT SEAM, ALBION MINES,  
ACADIA COAL CO.

I have grouped the above seams together because their workings are closely connected. By way of the third seam slope the coals from no less than 4 seams are drawn to the surface, viz:—Third Seam, Cage pit seam, 4 ft. seam, and Ford pit seam. In the Third seam, with the exception of some work done in No. 2 balance, west side, not very much has been done during the past year. The pillars in this balance, No. 2, are quite as large as those left in No. 1 balance and would appear sufficiently large to support this section of the mine, but at the time of my visit in January last, indications were sufficiently alarming to show that a "creep" was not very far distant, and since that time the management have had considerable trouble to preserve the return airways and levels.

The sinking in the Cage pit seam to which I made reference in my last report as being down a distance of 200 feet is now down 727 feet. I further, in said report, made reference to longwall working. This is in the 4 ft. seam and has been carried on for the past year; they are now in 2,850 feet west side from bottom of slope. The Cage pit seam underlying this 4 ft. seam is worked on Bord and pillar system, and after the coal is taken out from the 4 ft. seam the pillars are then drawn in the Cage pit seam. Nothing has been done since March on the new sinking on Cage pit seam except keeping the water out. The levels on east side are in about 3,000 feet, and the balances driven up.

The balances on the west side are also up, and the longwall working on Nos. 2 and 3 balances completed, and the bords on No. 3 are being driven in and the pillars are being drawn on No. 2. No. 4 balance, which it is intended to work by the longwall system, is up 600 feet. The two drifts connecting the Cage pit seam with the

Ford pit seam have been completed, and two slants are being driven in the Ford pit seam and are now down about 600 feet. The coal here is not so regular as formerly, nor of as high a standard of excellence. They have therefore ceased sinking for the present and have started the sinking on the Cage pit again. On the east side of the Third seam they are now driving a place for an airway. I would further say that a considerable amount of labor and money has been spent on this side on brick buildings for the purpose of isolating the old work from the new.

The new fan has not began to revolve, but it is confidently expected to do so in a few weeks. Some attention is now being given to the fan shaft of Ford pit and considerable repairs made, as it appears to have been decided that the next effort to recover this valuable mine will proceed from that point. The pit is now walled up 50 feet from the bottom and filled in behind with muck or mud and water.

#### MCGREGOR PIT.

The laying of the rails has been completed and a bank-head formed at bottom of shaft, and the coal will now be delivered at pit bottom and thence to surface by shaft, instead of by way of the slope as I had anticipated and expected. The levels on eastside of new sinking have been driven in about 900 feet and on west side about 700 feet; there are also two balances driven to the lift above, and thus a large area of coal is made ready for the workmen to begin active operations upon. A seam of coal 4 feet thick, known as the Fleming seam, overlies the McGregor seam with a band of shale 5 feet thick between. The management are now opening up this seam on the west side of the north slant. The coal presents a very good appearance, but I regret to say it is very fiery. It is proposed to work this seam longwall, before drawing the pillars in the McGregor seam. Some very successful pillar work has been done on the east side of the south slant, and when the pillars on this side are withdrawn as far as the solid it is proposed to continue the work farther south by the longwall system.

The airways and travelling ways are well kept up in this mine. A new pump has been placed to force the water from the deep to the pit bottom, and from thence it is forced by a Cameron pump to the surface.

#### SIX FOOT SEAM, THORBURN, PICTOU CO.

The coal basin was reached in the mine at a distance of 2,400 feet the last 600 feet of which was low coal. Levels were driven east and west from this point. The level going west was driven through coal varying from  $5\frac{1}{2}$  feet to  $2\frac{1}{2}$  feet in thickness, a distance of 9 chains and was then stopped.



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The East level was driven about 30 chains when they reached a fault, through which a place was driven and the coal obtained. The coal approaching the fault was of a rather inferior quality, as was also the coal after piercing through the fault. As the quality was not adapted for the market at present prices, this level was then stopped.

As the basin, or trough as it ought to be termed, dips towards the east, a road was driven towards its lowest point, the inclination of this road varies from level to 6°. A main and tail rope haulage is placed on this road for the purpose of drawing the cars between the 2,400 feet level and the trough. This trough begins at the slope bottom and widens as it goes east, and at the distance of 24 chains has widened to 6 ch., 50 lks., and at this point a back balance is working. Considerable trouble was experienced in getting a balance to work as the coal lies irregularly and in rolls. As it varies in thickness from 3 feet to 7 feet it is rather difficult and expensive to win, and unless something of a more encouraging aspect be met with, it would appear to be unprofitable to work in it much more, the indications being that there is very little coal unless it be on the south side, where it is possible there may be some good coal, although thin coal was met in driving the levels on this side, yet the chances appear to be favorable for coal, and it would almost seem a mistake if the water should be permitted to rise in this mine without having this question fully and definitely solved. Now is the time to make sure, and as there is coal both above and below this seam, they could be tested by either tunnel or bore hole.

#### DRUMMOND COLLIERY, WESTVILLE.

The slope is now down 4500 feet, and the coal appears to improve in quality the deeper it descends. The levels on the north side of 4000 feet lift, are in 3000 feet, and on the south side 3400 feet.—They have started on the north side to come back with the pillars. The levels on the south side are at present idle, but will in the near future in all probability be extended further.

The levels on the 4400 feet lift are now being driven north and south; on the north side they are in 200 feet, and on the south side 300 feet. The coal on the 3500 feet lift is worked out as far as was deemed advisable, care being taken to maintain the airways secure.

Connection has been made with No. 4 slope, the fault having been cut through, and during the past summer considerable coal has been taken out of No. 4. From present appearances it seems certain that a very large amount of coal will be won here at much less expense than winning it by way of the old slope.

The Scott pit has remained idle for the past year.

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In my last report reference was made to the necessity in view of certain connections then projected being made of the necessity of procuring a more powerful fan for these collieries. Now they have had running since last May a new fan called "The Walker's Patent Indestructible Fan," 18 feet by 6 feet; it has a capacity of 200,000 cubic feet per minute, with a water gauge of 3 inches, and is driven on the second motion by means of 6 cotton ropes. The engines are of the twin compound type, with a high pressure cylinder 17" diameter and low pressure cylinder 27" diameter by 3.ft. stroke. At this colliery they have now in use a new washer called the "Robinson Washer," capable of cleaning 100 tons of coal per 8 hours; there is also a "Shepherd Coal Crusher" in connection with the washer capable of crushing 100 tons of coal per 8 hours.

A new striker screen with revolving tippie and picking belt has been put in and gives good satisfaction. This new screen can separate 500 tons of coal per 8 hours, and has done so repeatedly.

This mine has hitherto had good ventilation, and the new fan has further increased the volume; and the present volume circulating can be increased, the fan not being as yet taxed to its full capacity.

#### SPRINGHILL MINES, CUMBERLAND COUNTY.

*No. 1 Slope.*—The principal work done in this mine for the past season has been "drawing the pillars" from the 1300 ft. to the 1900 ft. lift, and opening up some new work between the 1900 and 2600 ft. lift, yet various improvements have been made in other parts of this mine whereby the coal can be handled more profitably. A tunnel was driven 180 ft., connecting the two seams, east and west, by means of which all the coal from No. 2 sinking and west of it can be handled by the haulage rope, likewise shortening the distance 2000 ft. At the outer end of this tunnel a turnout has been constructed large enough to contain 80 boxes and the grade is arranged so as to permit the full and empty boxes to be handled with ease. In proof of this 412 boxes were passed through this tunnel on the second day after its being opened, which number I think might be increased to 1,000, should occasion demand.

Considerable repairs have been effected on the travelling way and fan-way from the 400 to the 1900 foot lift, and a new line of steam pipes put in from the 1900 to the 2600 foot lift. Improvements have also been made on the surface, affording increased facility for handling a large amount of coal. Four boilers have been removed from their old seats to a more advantageous position, and a new rotary erected, enabling them to handle the coal at this point, thereby dispensing with the services of one locomotive, and avoid all unnecessary shunting.

*No. 2 Slope.*—The drawing of the pillars from the 1900 foot lift



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has been continuously carried on during the year, whilst at the same time the work of opening up the 3000 feet lift has been vigorously prosecuted. The level on east side is now in 2100 feet, and the west level 1300 feet, and the second balances on both sides are being driven up. Some faults have been met with in the west mine bord causing considerable difficulty, yet the coal maintained its good quality and varied in height very little, averaging ten feet throughout. Two new lines of pipes have been put down and a light Janesville pump in this lift, affording increased power to dispose of the water, and as it is conveyed through the new tunnel they are in a position to take out all the pillars between Nos. 1 and 2 slopes. On the 1900 foot lift at the end of this section a new travelling way has been driven from the 1900 feet to the 1300 feet lift, in which railway iron was used for booms. Extensive repairs have been made in this slope since my last report. 500 feet of this slope has been stripped and retimbered with heavy slope timber, and on the east side of 1900 foot lift a portion of rib coal was taken away and built with timber a solid pack  $10 \times 70$ .

The slope was also double timbered from the 400 to the 1,300 feet lift, and at the same time the fanway pipe bord and travelling way were stripped and retimbered and the 1,300 foot overcast enlarged to 84' area.

The main slope is now used as a means of transit to and from No. 1 slope. The fanway is extended from the present fanway shaft to the surface, a distance of 115 feet, with an area of 90'. Preparations are being made for a new fan, which will be of the Guibal pattern, and built by Robb of Amherst.

*No. 3 Slope.*—Shortly after my last report a serious fire occurred on the surface at this mine, completely destroying the bank-head and engine-house and 600 feet of covered trestle, rotary, &c., and the connection between Nos. 2 and 3 slope. Yet, notwithstanding this serious reverse, considerable headway was made in this mine for the latter part of the year. The west level 1,900 feet was continued, three shifts working per 24 hours and No. 7 balance commenced.

The fanway was likewise cleaned and retimbered, and 4,000 feet of the mine bord cleared, enlarged and retimbered. As I anticipated, the rope haulage commenced in this section and worked satisfactorily. Arrangements have been completed for sinking 100 feet further, which, when completed, will make a total depth of 3,200 feet. The repairs throughout the mine have been faithfully attended to, and from appearances at my last visit I expect to see it very shortly in full activity. A new bank head is under construction and mechanics are working on the engine under the superintendence of Mr. Robb of Amherst, and it is expected to be in motion by the end of October first ensuing.

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The general appearance of those mines is very satisfactory, the airways are kept in first class condition and timber is plentifully supplied to working faces, and the travelling ways maintained in good order, and the comfort and convenience of the employees studied and attended to. The fire which destroyed the two engine-houses and bank-houses with the trestle work, began about the time the whistle usually blew in the morning, one hour before starting time, and the men hearing it for a time thought it was the usual whistle and not an alarm of fire, and thus the fire gained considerable headway before sufficient help arrived to extinguish it, and then although hundreds of men worked well the entire surface plant of Nos 2 and 3 slopes was completely destroyed. In spite of every effort, and with all advantages of fire pumps, hose, buckets, etc., it was found impossible to stay the flames, and in an incredibly short time two of the best bank-head plants in Nova Scotia were totally destroyed.

#### MINUDIE MINE, CUMBERLAND COUNTY.

In December, 1894, they began sinking and in January were down about 200 feet, but not much work was done as the water in April became too heavy for the pump which was finally covered. They succeeded, however, in getting the water out and worked for a short time when the supply of water for steam purposes failed. The mine was then allowed to remain idle for some months. But now, however, they are again taking the water out and will likely be hoisting coal very shortly.

#### CHIGNECTO MINE, CUMBERLAND COUNTY.

In this mine 4 to 6 men were employed from October, 1894, to March, 1895, taking coal out along the eastern crop. At each of my visits I found matters in general very well. There was fire, however, in this mine along the crop, and which was built off, and I think is likely out now.

#### THE SCOTIA MINE.

Here also 5 to 6 men were employed taking coal out along the western crop. There was fire in this small mine along the crop. I am inclined to think it is out now.

#### SMITH'S MINE AT MACCAN STATION.

Frank Burrows, in November last, began work here taking out some coal. He has kept the water out and obtained a small quantity of coal. This mine is well situated for local sales, being conveniently close to the main road, and I. C. R. Railway Station at Maccan, but it requires capital to sink the slope and obtain a lift of coal. At the present time there is only a lift of 50 to 60 feet of coal to the rise.

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JOGGINS MINES, CUMBERLAND COUNTY.

*No. 1 Slope.*—A pump was kept going here night and day until some time last May, when the night shift was stopped. 530 feet of this slope has been emptied and timbered. There is yet, however, about 200 feet of water in it.

*No. 2 Slope.*—This slope was worked continuously until last April, when a large inflow of water drowned the 2300 feet pump, and this lift filled with water cutting off all ventilation. Then gas began to show freely, owing to the airways not being kept sufficiently large for the small furnace in use, and the workings from the 2300 feet lift to the 1900 feet lift became partially filled with fire damp, thereby becoming unsafe to work in the 1900 feet lift with naked lights. Therefore the 2300 feet lift was stopped in April, and the 1900 feet lift partially worked, the workmen using safety lamps. About this time the manager, Mr. Archibald, resigned, and Mr. Henry McArthur, then underground manager, was appointed manager. Since taking charge he has had men continuously working in the airways, and now I consider that with a good furnace, or that which in my opinion is better, a good fan, this mine would be all right, provided the airways are maintained and kept in good condition. In April, from the general condition of the mine, gas being prevalent, I thought it advisable to summon you to look into the matter. On your arrival the mine was in a rather worse condition than at my first visit, and therefore it was insisted that the law in such cases be complied with, that is that no naked lights be used. This rule has been carefully observed and safety lamps only are used.

*No. 3 Slope.*—This slope has been worked steadily during the year, and quite an area of pillars taken out of the top lift west side. The levels have been driven in about 600 feet on east side of top lift. Not much work has been done on the 1300 feet lift this year. Another new lift of 570 feet has been sunk in this slope and levels driven east and west to give room for a back balance on each side. The intention at present is to drive from No. 2 slope into No. 3 from the 1900 feet lift in No. 2 and strike the 1870 feet lift in No. 3, and then the coal will in all probability be taken out this level to No. 2 slope, thence to surface. There is pressing need for some better ventilating power at these mines.

## LONDONDERRY IRON MINES, COLCHESTER COUNTY.

I visited these mines in January and found the east mine working and was pleased to find them in good condition. I had been informed that the mine was in a dangerous condition from scarcity of timber, but I found on the contrary it was well ventilated and timbered and plenty timber in the mine lying ready for use.

I found very little work doing except tribute work.

Several small gangs of men were working in different places and appeared to be well equipped with timber, &c

CAPE BRETON MINES.

In company with Mr. Neville, Deputy Inspector of Mines, I visited Sydney mines, and tested the air with Stokes' patent gas tester and Livings' gas tester. Ventilation was very good and the mine comparatively damp. We could get but a very small trace of gas,  $\frac{1}{2}$  p. c. Caledonia mine we found in much the same condition as Sydney, viz., about  $\frac{1}{2}$  p. c. of gas.

In the Dominion No. 1 we found  $\frac{3}{4}$  p. c. This mine is comparatively damp and ventilation fair. The days on which we visited those mines was very favorable, the temperature being very low for the time of year.

I have the honor to remain,

Yours very faithfully,

WM. MADDIN, JR.,

*Deputy Inspector of Mines.*



## ACCIDENTS.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
	1894.				
1	Oct. 25.	Third Seam.	Alex. McInnis.	Miner.	Hand badly smashed ; drawing a shot.
2	" 30.	No. 3 Slope, Springhill.	Alex. McKenna.	Loader.	Leg broke ; full box ran over him.
3	Nov. 3.	Drummond Colliery.	John A. Douglas.	Whf. Laborer.	Foot smashed ; attempting to get on engine.
4	" 8.	"	William Munro.	Laborer.	Badly injured ; fell from railway car.
5	" 21.	Acadia	Hector Cameron.	Shiftman.	Arm broke ; runaway on slope.
6	" 23.	No. 3 Slope, Springhill.	Donald Carrigan.	Miner.	Leg broke ; fall of coal from working-face.
	1895.				
7	Jan. 15.	Third Seam.	James Campbell.	Driver.	Arm broke ; between two boxes.
8	" 16.	No. 1 Slope, Springhill.	Natali Gualtieri.	Miner.	Fatally injured ; fall from roof.
9	" 25.	Third Seam.	John Dakins.	Loader.	Leg broke ; full box ran over end of rails.
10	Feb. 26.	No. 2, Springhill.	Wm. Horone.	Miner.	Fatally injured ; fall from roof.
11	Mar. 28.	Joggins.	John Feely.	"	Leg broke ; fall of clay from working-face.
12	" 29.	"	Sylvine Babine.	"	Leg broke ; fell, walking down slope.
13	Apl. 10.	Acadia.	Alex. Glenn.	"	Killed ; fall from roof at working face.
14	" 15.	Joggins.	Henry Fargua.	"	Burned by gas.
15	May 17.	Drummond Colliery.	Charles Foster.	Trapper.	Leg broke ; full box passed over it.
16	" 20.	"	John Foley.	Miner.	Ankle smashed ; full box passed over it.
17	June 3.	"	Charles Stewart.	Driver.	Arm broken and hand smashed ; drawn into wheel from endless rope haulage.
18	July 10.	Joggins Mines.	Chester Bouldry.	"	Collar-bone broken ; getting on rake whilst in motion.
19	" 26.	"	Alex. Glabias.	Miner.	Seriously injured ; fall of fire elay.
20	Aug. 23.	Drummond Colliery.	Lawrence Carrigan.	Trapper.	Leg broke ; boxes passed over him.
21	" 31.	No. 1, Springhill.	H. T. Matheson.	Miner.	Fatally injured ; taking down top coal.
22	Sept.	Drummond.	George McKay.	"	Seriously injured ; fall of coal from working-face.
23	" 28.	"	John Nicholson.	Trapper.	Three fingers taken off by wheel of tail rope.

Amount of Air, circulating per minute, in the undermentioned Collieries.

MINE.	COUNTY.	MEASURED BY ME AT OFFICIAL VISITATIONS.											
		1894.						1895.					
		Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.
Third Seam	Pictou.	43920	46200	47500	67000	65780	64500	58750	59300	43750	46845	45600	44200
McGregor Pit	"	103780	106000	107000	88800	98750	99500	97500	101500	100000	96420	100200	105000
Drummond Colliery	"	87000	89900	86000	89000	92000	90000	87500	87000	130000	115000	120300	113000
Scott Pitt	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 4 Slope	"	.....	22000	24500	27000	26500	24000	22000	20000	28200	30000	29300	.....
Acadia	"	62000	60600	Idle.	.....	.....	.....	66500	62000	60000	.....	61200	.....
Six Feet Seam	"	23400	26000	28000	27500	26000	27800	24000	.....	20000	.....	21200	20500
Springhill { No. 1	Cumberland.	73400	74700	75000	73100	70500	73000	70000	71200	63200	62900	62400	61700
Mines. { No. 2		25200	54500	60000	57600	58000	54000	52000	50500	56000	57400	58000	57700
{ No. 3		54300	60000	52700	Idle.	.....	.....	.....	.....	.....	.....	.....	.....
Joggins	"	21000	19700	20000	21100	21200	22100	21200	21400	18000	20000	19700	18000
Minudie	"	.....	.....	1750	1500	.....	1000	Idle.	.....	.....	.....	.....	.....
Chignecto	"	2000	1000	1500	1200	900	.....	Idle.	.....	.....	.....	.....	.....
Scotia Mine	"	700	1500	500	2000	.....	700	Idle.	.....	.....	.....	.....	.....
Smith Mine, Maccan	"	.....	.....	.....	.....	900	1000	.....	1200	1000	1100	900	.....
Joggins, No. 3 Slope	"	.....	.....	.....	.....	.....	.....	11500	7200	8300	9000	Idle.	990





STATEMENT.

*Timber used at Springhill Collieries, from 1st October, 1894, to 1st October, 1895.*

BOOMS :—

22' × 12"	18' × 13"	14' × 6"	14' × 10"	12' × 9" and 10"	10½' × 9"
2	62	14773	1317	4258	5191

PROPS :—

12' × 5"	10' × 5"	5½' × 5"
13,780	33,245	24,099

Plank.....	222,139 feet
Boards.....	190,203 "
Scantling.....	107,500 "
Spruce Timber.....	104,386 "
Hardwood.....	71,343 "
Rollerwood.....	7,485 "
Pit Penning.....	912 dozen
Slabs.....	1,730 "
Cap Pieces.....	36,570 "
Powder.....	23 pounds
Dynamite.....	524 "

September approximate.

### CAPE BRETON COUNTY.

The sales from this county amounted to 1,031,341 tons, compared with 1,114,773 tons in 1894. This decrease was apparently due to general dullness in trade, especially in the Quebec and Newfoundland markets, the sales to these points being respectively 573,633 tons and 80,084 tons, as compared with 664,926 tons and 93,111 tons in 1894.

The output of the principal collieries was as follows :—

	Tons.	
	1894.	1895.
Dominion Coal Company .....	950,683	905,671
General Mining Association .....	234,672	259,608

During the past season the railway of the Dominion Coal Co. has been completed from Glace Bay to Louisburg. A well designed pier has been built here capable of handling a large tonnage of coal. The railway is a fine piece of work, well ballasted, heavy rails, and easy grades. It has been stated that contracts have been taken which will give the question of the winter capabilities of Louisburg a fair test. I presume that the report of the Provincial Engineer will give full particulars connected with it. The numerous improvements above and below ground introduced by the Dominion Coal Company at their mines are fully referred to by Mr. Neville in his report.

At the General Mining Association, Sydney Mines, the returns shew a gratifying increase in the output, and this is worthy of notice in the case of submarine workings, which have for some years been a long distance from the shafts.

A good deal of work has been done in attempting to follow into the Glace Bay district the Mullin's seam of Low Point. So far as I have had an opportunity of learning the results of the work done during the past few years, its extension from Sydney Harbor to Lingan Basin has not yet been clearly traced. The seam at the head of Lingan Basin, which has been traced for over a mile back from the shore, has been assumed to be its equivalent at this part of the district. Attempts have been made to prove this seam by boring in the rear of Glace Bay, but up to date of writing without effect. Little work has been done at any other point in the country, although large tracts are maintained under licenses.

I beg leave to present here the report and tables of P. Neville, Esq., Deputy Inspector for the past fiscal year :—

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BRIDGEPORT, Oct. 15th, 1895.

E. GILPIN, JR., ESQ.

*Deputy Commissioner and Inspector of Mines.*

DEAR SIR,—I beg leave to submit to you a report on the coal mines that I have visited during the year ending September 30th, 1895.

*New Campbellton.*—Work has not been as brisk at this mine as it was last year, partly owing to the St. Peter's Canal not being open this season, through which a large number of small sized vessels carried coal. In the pit the west levels have been extended and rooms broken off to the rise. All the coal that has been shipped this season has been mined from those rooms on the west side of the slope. On the main level in which the coal is drawn, the roof has been taken down to give height to haul the coal to the slope bottom by horses. Air courses have been repaired and the ventilation improved. Mr. Burchell after carefully examining the rocks to the north and over main seam, discovered that the angle of dip was much higher than he expected, and than was laid down in the Geological maps, giving a far greater depth of coal bearing strata above the present seam. With that understanding he has commenced boring, expecting to find a thicker seam, the equivalent of the Sydney Main Seam; the bore hole is now about 400 feet deep.

*Sydney Mines.*—The principal work that has been done at this colliery during the year, in addition to the getting and shipping of coals is as follows:

In the pit a back deep has been driven on the north side parallel and near to the engine plane, and a good road laid therein, the object being to have a double road whereby the empty trip of tubs might be run down while the full trip was being drawn up. This work was accomplished about the 26th of August, and gives satisfaction. From No. 2 District a Self-Acting Incline has been driven 1200 feet in length and rails laid therein. An air compressor plant has been erected. This plant consists of an Ingersoll Compressor with a multitubular boiler erected on the surface. One air receiver near by, and three in the workings, 6046 running feet of mal. iron pipes to convey the compressed air from the surface, and two Duplex pumps, one placed at a point in the workings 1220 yards from the pit bottom, the other situated 1752 yards from the pit bottom which are now pumping water from the north deeps and submerged workings.

This plant was got into successful operation about the 9th of September. The ventilation has been greatly improved throughout the pit by additional airways and an improvement in the fan. A small quick running engine with two multitubular boilers has been

set up at the Queen Pit to operate the ten foot Murphy fan. This fan is kept as a standby to assist the large one if necessary.

The efficiency of the Guibal fan has been much increased during the season by putting in an anti-vibration shutter imported from England.

New pulley legs and pit head frame have been put up at Princess pit. Sixty coal cars, having a capacity of six tons each, have been purchased. Ten new cottages of improved style have been added to the large number of workmens' houses.

Some 1,400 feet of cage slides have been replaced by new ones in the winding shaft. A line of pipe has been laid from the borehole mentioned in my last report to the stables and workshops whereby an ample flow of excellent water is obtained, which is convenient to the workingmen's houses. Also another borehole near Queen pit 4 inches in diameter and 155 feet deep has been sunk to a feeder of good water, which is in easy reach of the workingmen and inhabitants.

*The North Sydney Mining and Transportation Co., Ltd.*—Work was commenced in June last under the above-named company, superintended by John Greener, Mining Engineer. A water level has been driven from the bottom of what is called Barrington's Brook at Indians' Cove into No. 3 seam, the crop of which crosses this brook. This level has been driven 800 feet and 17 rooms 15 feet in width broken off.

A wharf has been built, length 200 feet, height above water 20 feet, depth of water at high tide 14 feet. A railroad has been laid, 900 feet in length, from the mouth of the level to head of wharf.

There have been about 40 men employed in construction, and at present about 20. Five small cargoes of coal have been shipped since the 14th of September.

#### DOMINION COAL COMPANY.

*Old Bridgeport.*—Six dwellings for miners have been erected. The hauling engine that has been in use at Gowrie has been removed and erected on the surface here hauling coal from the deep workings. An additional furnace has been built, which increased the ventilation 10,000 cubic feet per minute. The main deep has been driven down 400 feet further and rooms broken off. There are 40 rooms in this district all worked by 8 Ingersoll coal cutting machines, with the exception of 8, which are worked by hand cutters. Fifty pairs of hand cutters are employed to the Rise workings. Some of the pillars along the crop of coal have been taken out. In places the roof breaks to the surface, letting in air, which interrupts the venti-

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lation. This had to be very closely looked after this season. It is the intention of the management to sink a shaft this winter for the purpose of hoisting and lowering the workmen and material. Also to erect a fan, which is very much needed.

*Victoria*—The south and west deeps have both been abandoned and work concentrated upon the centre slope. This has been widened, re-timbered, and double-tracked from top to bottom. Two new balances have been driven, and an output of 600 tons per day maintained. A bore-hole has been put down from the surface, striking the foot of the deep, which is intended for pumping purposes, but not yet completed.

*Dominion No. 1.*—The plant has been completed, and now consists of a pair of 48x20 hoisting engines, a pair of 24x16 man engines; two Ingersoll air compressors; a combined air and steam 12-foot Murphy fan, driven direct by a 12-inch engine cylinder. All the necessary buildings on the surface have been completed, consisting of office, warehouse, blacksmith and carpenter shops, engine house, boiler house, containing 3 Babcock boilers; bankhead dumping cages, screens, and shoots.

Below ground the north deep has been carried 2000 feet, and the south deep 1000 feet. Rooms have been broken off the north deep as they progressed. The south level, towards Old Bridgeport, has been extended to a distance of 1,500 feet, and rooms broken off. There are now about 80 working places in the mine. Two 18x36 hauling engines have been placed below ground, which hauls the coal from both deeps, by the endless haulage system. The air for coal cutting and pumping is forced through an 8-inch main pipe. The whole of the coal in this mine is cut by machines, of which there are about 15 now at work.

*Reserve Mine.*—Two new Babcock boilers have been erected, and ten old boilers and one engine taken out. The endless haulage has been completed in main slope. Endless haulage for main and French slopes is connected with friction clutch gear to one engine, which now does the whole work of this mine, whereas two have been working for the last thirty years. A new bank house has been erected, with new screens and dumping cages; also a slack pocket, capable of holding 1000 tons of slack; elevator and conveyor for feed of same, and separating the nut from the slack. In the pit the pillars on the west side of the main slope, up to near the crop, have all been successfully drawn. The lower deep workings have been extended, and the levels south and north carried on.

*International.*—One new Babcock boiler, one brick chimney 100 feet in height, and twelve miners' cottages have been erected. Endless haulage for main deep, with engine on surface, has been completed and gives satisfaction.

The main deep has been driven down 800 feet, and rooms broken

off on both sides. The travelling road has been extended to the bottom of the south side workings.

*Little Glace Bay.*—Two new Babcock boilers, one new brick smoke stack 100 feet high, a new stone engine-house, and one Rand air compressor have been erected. The endless haulage for deep and main level with engine on bank is completed, and works well.

The level haulage to where the wheel is situated is 3,800 feet. Electric signals are used over all the endless haulage. The north shaft levels have been driven 600 feet, north deep levels 800 feet, south deep levels 350 feet. The Murphy ventilating fan was removed from the Harbor pit up to the Sterling or Little Glace Bay pit, where it is giving satisfactory results. Twelve miners' dwelling houses have been erected.

*Caledonia.*—Twenty miners' houses have been erected. The endless rope haulage system has been put in operation underground here, and is giving every satisfaction.

Improved approaches at the pit bottom are being made. No. 5 east level has been extended 4,500 feet, the west level about 200 feet, and a section of long wall workings opened up at the extreme end of the west level with a working face of 600 feet.

*Gowrie.*—Two new Lancashire boilers and one Rand air compressor have been put in place. The main deep has been driven down 800 feet and a new section of workings opened up there. The Endless Rope Haulage System is also working well here.

*Hub.*—This mine has been entirely re-opened. Half a million tons of water were pumped out of it between the 28th of December and the 15th of March. About 50 rooms have been relaid, and are now working.

Headways have been driven towards the rise, from which levels are to be driven. The coal and timber looks well for a mine that has been full of water for over 22 years.

The shaft has been enlarged for a man cage and well lined with pitch pine, and surface dumping cages put in; a large timber bank head erected with screens, shoots, weighing scales, hoisting cages, etc.; one pair of Corliss hoisting engines 24" diameter by 42" stroke; a pair of man engines 16 in. by 24 in. stroke; two Babcock boilers with Cameron pump, capable of raising 500 gallons of water per minute from the mine. A carpenter's shop, blacksmith's shop, and a stable has also been erected. In addition to the kind of lamps mentioned in last year's report there has been a safety lamp now in use at the Dominion Co. works, called the Appelton & Grey lamp. It is counted about the best yet in use here.

I remain, your most obedient servant,

P. NEVILLE,

*Deputy Inspector of Mines.*

Official Visits Year ending September 30th, 1895.

MINE.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.
New Campbellton.....	12	.....	15	.....	.....	.....	30	29	27	24	3	4
Sydney .....	31	27	8	29	23	12	4	10	8	25	17	16
" .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	.....
North Sydney .....	.....	.....	.....	.....	22	12	4	.....	7	25	17	.....
Victoria .....	16	17	18	26	26	18	9	3	22	27	26	23
Dominion No. 1 .....	26	16	6	14	9	5	11	6	10	5	9	4
" .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....
Reserve .....	22	8	7	12	14	4	19	30	15	3	14	11
International .....	27	20	21	.....	12	16	6	31	11	6	10	12
Old Bridgeport .....	25	19	20	15	13	9	24	21	20	4	22	10
Little Glace Bay .....	23	15	5	19	15	2	20	22	12	9	13	6
Hub .....	23	.....	.....	18	15	2	20	17	13	8	12	5
Caledonia .....	9	12	4	16	18	14	5	8	6	17	19	9
" .....	.....	.....	.....	.....	.....	.....	22	.....	.....	.....	.....	.....
Gowrie .....	2	7	12	17	25	7	13	27	19	26	15	13

## ACCIDENTS IN CAPE BRETON COLLIERIES DURING THE YEAR ENDING SEPTEMBER, 1895.

DATE.	MINE.	NAME.	OCCUPATION.	AGE.	REMARKS.
Oct 15..	Victoria.....	Alexander McInnis ..	Driver .....	15	Killed, caught between coal box and pillar.
" 23..	Caledonia .....	Dan McKegan .....	Trapper .....	14	Slightly singed by gas, idling through old works.
" 23..	Victoria.....	Edward Brophy.....	Miner.....	52	Singed by gas in top of shearing.
March 23..	Hub.....	John Davidson.....	" .....	48	Killed, fell from stage down shaft.
" 23..	" .....	Bosel Gracy .....	" .....	52	" "
April 10..	Gowrie .....	D. H. Ferguson.....	" .....	30	Hip and back hurt, piece of coal from face of room.
" 16..	Dominion No. 1.	Dan Hardy.....	Surveyor .....	32	Killed by explosion of gas.
" 16..	" .....	Alexander McKinnon .	Overman .....	30	" "
" 29..	Victoria.....	Hugh McDonald .....	Driver .....	14	Hurt on head by trap door striking him, forced open by coal box.
June 3..	Dominion No. 1.	Edward Rogers.....	Overman .....	35	Struck by runaway coal box, wrist bone broke and hurt on back.
" 20..	Old Bridgeport.	John McCush.....	Miner.....	23	Hurt on back from fall of coal.
July 18..	Caledonia .....	Donald Paterson.....	" .....	24	Slightly hurt, caught between coal boxes.
" 8..	International ..	John Cameron .....	" .....	40	Heel cut by piece of stone from roof. Died 22 days after.
" 23..	Old Bridgeport.	William McKegan ....	" .....	32	Back hurt by piece of roof coal falling on him.



July	25..	Old Bridgeport.	Hugh Miller .....	Miner.....	25	Arm broke by piece of coal from face.
"	27..	"	William Barron .....	" .....	22	Head cut by piece of coal falling down shaft.
Aug.	13..	Gowrie .....	Hector McLean .....	Brakesman .....	19	Killed, fell under coal car on surface railroad.
"	20..	Sydney .....	Andrew Groves .....	Miner.....	40	Back hurt by fall of stone from roof.
"	28..	"	Alexander Ferguson ..	" .....	24	Slightly burned by gas in room.
"	28..	"	William McIntyre .....	" .....	23	"
Sept.	9..	Gowrie.....	Archy Nickleson .....	" .....	22	Leg broke by piece of coal from junk.
"	14..	Reserve .....	Michael Gardner .....	" .....	22	Back and spine injured by piece of roof coal.
"	21..	Dominion No. 1.	John Mircer .....	Lab. on surface.	30	Leg hurt, caught in coils of rope lowering coal cage.

*Cubic Feet of Air per Minute Circulating through Cape Breton Mines Year ending September 30th, 1895.*

NAME OF MINES.	Oct.	Nov.	Dec.	Jan.	Feb.	June.	July.	Aug.	Sept.
New Campbellton .....	9120	.....	9000	.....	.....	10790	10792	9960	10960
Sydney .....	61500	66561	66900	72980	69890	82400	86000	99600	89870
North Sydney .....	.....	.....	.....	.....	2300	1820	1210	1190	2700
Victoria .....	6000	6000	59000	69000	60000	60100	62009	50300	64200
Dominion No. 1 .....	12000	9800	10000	12600	12006	13630	35600	35994	52000
Reserve .....	61200	61300	60200	60530	57370	45690	59810	58000	61100
International .....	60000	60000	23100	.....	39920	41200	49400	65400	65000
Old Bridgeport .....	25000	21400	19200	21000	19000	20500	23900	36700	36200
Little Glace Bay .....	30000	30101	26900	30000	28790	22850	48000	35200	39200
Hub .....	.....	.....	.....	.....	.....	5300	16000	16020	9887
Caledonia .....	70000	69900	69780	60000	50020	62200	65460	66476	68200
Gowrie .....	38010	39500	38000	38900	28000	38760	30230	35400	31390

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I also append copy of special report made to you on a fatal accident at Dominion No. 1 Colliery, Cape Breton Co.

HALIFAX, N. S., June 4th, 1895.

C. E. CHURCH, ESQ.,

*Commissioner of Public Works and Mines.*

SIR,—Pursuant to your instructions, I have held an investigation at Dominion No. 1 Colliery of the Dominion Coal Co., at Old Bridgeport, Cape Breton Co. I secured all the available evidence which was taken down by a sworn stenographer, read over to each witness, and signed by him. This has been written out, and is herewith submitted, together with plans of the Colliery Nos. 1 and 5.

The subject matter of the investigation was an accident causing the death of David Hardy and Alex. McKinnon, by an explosion of gas as reported by the manager of the mine to have occurred on April 16th, 1895. The investigation was commenced on May 23rd, and continued until all available evidence had been secured.

It appears that the accident took place in the North Deep levels. The men were both burned, but their death would appear to have been directly caused by after-damp while they were endeavoring to escape.

Hardy was employed as a surveyor, and McKinnon's occupation was to examine the workings before the men went to work. He had been employed in that capacity on the morning of the accident. Hardy left the pit bottom during the morning to make some measurements in these levels, and was given McKinnon as an assistant. Nothing further is known of their movements, and there is no positive information as to the circumstances surrounding the accident. I will therefore not discuss this point further, but turn to the cause of the accident, the facts elicited bearing on the state of the pit contributing to an accumulation of gas in the workings in question. It appears that from the time the coal was reached, gas was given off more or less continuously. Ventilation was effected by means of a steam jet, and the evidence showed that with care the pit could be kept in a workable condition with respect to the use of explosives, with one exception. This was that in a working known as "Burts" gas had been reported on more than three consecutive days. The continuation of the use of gunpowder under these conditions was a direct violation of the Act. The working in question was shortly after abandoned. The North Deep levels (in which the accident happened) were not worked after the first of the present year. About the 26th of March, it was found necessary to remove and stow some refuse which had gathered during the construction of the engine room. This engine room extended from the high side of the mine bord of these levels to a few feet of the bottom of the air shaft. The upper part of it therefore, was part of the old mine

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level. The mine bord ran from the engine room one way about 400 feet to the face of the levels, and the other way about 50 feet to the head of the North deeps. The air for this section entering the engine room passed along this mine bord to the face, then returned by the main level and rooms down the North deep. The heads between the two levels were provided with wood stoppings. It appears that while the levels were working the air was sufficient. In order to provide a means of exit from the engine room for the refuse, the stopping between the levels nearest to the engine room on the "face" side marked A on plan was removed. After the refuse was removed, it appears that this stopping was not replaced. After an interval of about a month the accident occurred. Evidence showed that those practically engaged in the management and working of the mine agreed that the removal of this stopping would permit the air originally intended to go around the face of the levels to pass through it as a short cut to the North deeps and not allow the level to be ventilated. This would in my opinion be especially the case with a comparatively limited amount of ventilation such as was attainable by a steam jet at the time of the accident. In my opinion the evidence showed that the accumulation of gas which caused the fatal accident was directly due to the non-replacement of the stopping removed to permit of the stowage of the refuse from the engine room.

It may be asked why, if the ventilation had been practically destroyed in these north deep levels from about March 26th to April 16th, no accident had occurred sooner?

To this the answer may be made that there did not appear to have been any person in that section of the mine between March 28th and April 16th, except Charles Weir, Underground Manager. He gave evidence that he had been in there between these dates. If he had been in presumably he had run some risk, as he stated that he went there believing that the section had been examined every day, and he did not take a safety lamp. While his evidence was positive that he did go, it is of little value as to the state of the ventilation, as it was contradictory, and he finally admitted that there could not be sufficient air if the stopping was down, and that there was no current, a fact which even a witness as unwilling as he proved to be, had to admit. The accumulation of gas in an atmosphere dull as it must have been in these workings, may have been going on for some time, to form even the limited amount that exploded.

The question next to be considered is that of the responsibility for the neglect to maintain a proper ventilation in that part of the mine. The order for the removal of the stopping, Mr. Johnstone, Manager, stated in his direct evidence, was given by him to Weir coupled with an order to replace it by a canvas door. This, if carried out, would have maintained a current. Weir at first ad-

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mitted he was told to take down the stopping, but afterwards withdrew that statement, but finally admitted it. He declared he was not ordered to put up a canvas door. Johnstone, on being recalled, stated that he did instruct Weir about the removal of the stopping, and its replacement by a canvas door.

As regards the examination of the old or abandoned workings, one of which was the section of the pit in question, Christiansen, "Pit Examiner," stated that Weir told that "it was not necessary to examine these old workings because the road was taken out, and I did not have time to examine them in the morning." Weir denied this. Christiansen reaffirmed his statement. Weir affirmed that he was relieved by Johnson of the responsibility of looking after that section of the mine when removal of the refuse from the engine room was commenced. This was directly contradicted by Johnston. It appears from Weir's own evidence that he continued to visit this section of the mine, that the non-replacement of the stopping and the consequent effect on the ventilation was brought to his notice, and that he did not see that the stopping was replaced by a canvas door or by another stopping. He stated that he gave an order to replace the stopping and requisitioned for brattice. The storekeeper however, states the order for brattice was given March 18th, some days before the stoppings were taken down.

Not to further extend the matter, I would remark that it is evident from Weir's own statements as to his responsibility and that of the officials of the pit, that his ideas of the duty of an underground manager were not fully considered by him. Any difference of evidence between him and any other individual witness might not be of moment, but when his evidence on almost every point was directly contradicted by some one or other witness, I am led to entertain strong doubts of its correctness. On a careful consideration, I am of opinion that Mr. Weir had full charge as underground manager, that he received orders to take down the stopping in question, and to replace it by a canvas door, that he did not see that it was replaced as he should have done, knowing as he admitted that its removal had a most momentous effect on a section of the mine from which gas had been given off. That he was not justified in curtailing the examination of the old workings, and that in my opinion he was for these reasons responsible for the state of affairs which led to the explosion.

I am the further led to believe this to have been the case because the evidence shows that in other important respects there were violations of the Mines Regulation Act, which I consider he was aware of or should have known by a proper supervision, and which should not have taken place.

The evidence showed that these levels not in course of working were not properly fenced off, that he ordered unlocked safety lamps

to be given out, and that men were permitted to enter their working places before being advised at the proper station.

I submit that these points are clearly proved by the evidence submitted.

I have the honor to remain, yours obediently,

[Sgd.]      E. GILPIN, JR.,  
*Inspector of Mines.*

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## MISCELLANEOUS.

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In Victoria County, the Messrs. Burchell have continued opening and working the new Campbelltown property. Their sales have been seriously interfered with by the prolonged closing of the St. Peter's Canal for repairs. Mr. Neville refers to their labors in boring for the Sydney mines main seam on their area.

In Richmond County no work has been done. At Broad Cove, Inverness County, Mr. Hussey has built some houses, opened the veins at a number of points, and partly built a railway from the openings to McIsaac's Pond. At this point the preliminary work of dredging has, I am informed, been done as far as permitted by the capacity of the dredge employed. A larger dredge is to be procured to secure the necessary depth of water. As soon as the shipping place is opened there should be no difficulty in securing a large output of coal from the present openings.

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## GOLD.

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The returns for the year ended Sept. 30th, 1895, show 22,112 ounces, 17 dwts., and 21 grains.

In the last report the returns from the Stormont district were 1,980 ounces. Owing to the dilatoriness of those required to make mill returns, the Department, although making every effort, was unable at the date of the report passing into the hands of the Queen's Printer, to give the full returns. Whatever advantage may accrue to the miner, the investor, and the general public from the publication of the annual yield of each district, there can be no doubt promptness is very desirable. The reputation of each district in this respect rests entirely with the mill owners.

These returns, when finally made up, showed a yield of 5,402 ozs, 13 dwts, 17 grains, making the total yield for the Province for the year, 1894, 18,402 ozs, 16 dwts, 12 grains.

I append the returns from Stormont as finally compiled :—

RETURNS FROM STORMONT GOLD DISTRICT FROM OCTOBER 1st,  
1893, TO SEPTEMBER 30th, 1894.

MONTHS.	Tons.	Ozs.	Dwts.	Grs.
October .....	1692½	628	7	12
November .....	1493	705	16	.....
December.....	1354½	544	8	18
January .....	1480	476	19	10
February .....	1229½	396	0	0
March .....	1423	370	18	0
April.....	1197½	348	17	0
May .....	1173½	297	8	0
June.....	689	229	17	0
July .....	496	124	15	0
August.....	1016	181	15	0
September .....	1485	256	8	0
One return from January to	.....	4561	9	16
September .....	2424½	841	4	1
	.....	5402	13	17

The returns therefore show a gain this year of 3,710 ounces.

Reference may be specially made to the Stormont and Renfrew districts, where 28,147 tons were crushed for a yield of 7,414 oz., 17 dwts., 13 grs.

Averaging between 5 and 6 dwts. Renfrew yielded 1,366 ounces from 1,242 tons, an average of over one ounce.

The necessary surveys have been made by Messrs. Pye, Anderson, and Christie.

The mines have been visited by Messrs. Christie and Madden during the past season, and have been found to have been worked fairly in compliance with the requirements of the Mines' Regulation Act. Owing to the ephemeral nature of much of the preliminary prospecting and development work, it is not possible for the Department with the means at its disposal to visit all openings as they are made. Every effort, however, has been made to see that the requirements of the Act have been carried out. I append the report of an enquiry



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into a fatal accident at Rawdon during the year, and other reports of inspection :—

REPORT OF INSPECTOR AS TO PARTICULARS OF THE  
DEATH OF WM. SMITH, AT RAWDON, SEPT. 23RD, 1895.

DR. GILPIN,

*Inspector of Mines for Nova Scotia.*

SIR,—In accordance with the instructions contained in your letter of Sept. 27th, I went to Rawdon on Sept. 28th, to get the particulars of the death of William Smith. The general particulars are as follows :—

William Smith, laborer, widower.

Age—51 ; family of three children grown up.

Date—September 23rd, 1895.

Killed by water barrel falling down pit.

Place—Prospecting pit on property under license application to John Madill in old Rawdon Mines district.

Coroner—William J. Fenton, East Rawdon, Hants Co.

Verdict of Jury—"That William Smith's death was entirely accidental and partly due to his neglecting to heed the warnings that had been given him not to stand in the shaft when the tub was up, and also not paying attention to Polkinghorn when he called out to him ; and exonerate all other persons from any blame."

After making an examination of the pit and comparing the statements of the men about the pit with the evidence as taken by the coroner, I understand the accident to have been caused as follows : John Madill, of Milford, has been prospecting for about three weeks on some areas applied for by him at Rawdon, and the deceased was understood to have a part interest in the enterprise. Smith has worked about Rawdon mines for a considerable time and led Madill to believe that there was a good chance on the said areas. Madill decided to go in an old pit there some 35 to 40 feet deep, and entered a drift that had been driven on the bedrock some 60 feet to the southward of the pit. He put up a horse gin and worked two tubs in the pit. The water was baled out, the bottom of the pit sunk down a short distance and the pit timbers repaired. The drift was being cleared, the floor cut down, and the drift retimbered. Madill had 3 men employed with him and a boy to drive the horse. James Stewart, a miner, was in charge of the work of the drift and

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William Smith, the deceased, was his helper, and his work was to bale water, fill tubs and give Stewart what assistance he would call for. George Polkinghorn was the deckman. The middle of the pit I found was not 2 feet below the floor of the drift and the bottom sloped up to the portal of the drift not over four (4) feet away. In the west end of the pit a screen of timbers and boards had been put in to prevent anything falling into the entrance of the drift and as a cover for a man working in the bottom while the tubs were being hoisted. Before going down into the drift the water was baled out as far as the tubs would fill themselves and then Stewart would go down to work in the tunnel and Smith would fill the tubs with a pail. Madill explained to me that when they commenced work at this old pit that the two ends of the hoisting rope had grummet rings fastened to them by turning the ends of the rope around the grooves of the grummets and splicing the ends into the body of the rope. On the Thursday previous to the accident a piece of stone from a shot had cut the rope near the splice and the rope had to be cut back to where it was sound. Instead of splicing the end of the rope as before, they tied it around the groove of the grummet with a simple knot and turning the end up seized it to the body of the rope with a piece of small rope. The connection with the solid ring in the bale of the tub was made by a short piece of chain doubled and fastened to the grummet ring by a common shackle and key bolt. The tub that killed Smith was the east end tub, and he usually stood in the west end of the pit while filling. The descending tub would reach bottom some little time before the rising tub could be landed. Madill and Stewart both claim that they had often cautioned Smith not to get under a tub that was up. On Monday, the 25th inst., Stewart and Smith had gone down as usual at one o'clock. Stewart went into the drift to put in a brace, and Smith was baling water. The accident occurred about 1.15 p. m. George Polkinghorn was tending deck and Madill was driving the horse. As the tub was nearing the deck, Polkinghorn noticed the end of the rope was slipping through the seizing and letting the tub down. He called out to Smith, who had unfortunately lifted the west tub over to the east end and was directly under the east tub. Madill claims that he saw the tub settling before it gave way and that he saw this after Polkinghorn gave the alarm. Stewart says he heard Polkinghorn call out some little time before the tub fell. If this is correct Smith had time to get over on the west side before the tub caught him. Smith appears not to have realized that Polkinghorn was warning him. The tub fell directly on his head driving it against the other tub, smashing the whole top of his skull and causing instant death. After careful consideration of the statements and the condition of the pit and rig I am of the opinion that all hands were ordinarily very careful, but that it was an error in judgment in tying the rope in a single knot around such a large grummet ring and seizing short without sufficient number of turns. The seizing was made with small rope of  $\frac{1}{2}$  in. or a  $\frac{5}{8}$  in. diam. and probably would not take close enough a hold. Smith is described

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as a man of slow perception or said to be stupid at times. I consider the accident would not be expected to happen under ordinary practice and that it took the accident to prove that such was likely to happen. The rig is new and the pit a very safe one.

All of which I respectfully submit,

F. W. CHRISTIE.

HALIFAX, Sept. 30th, 1895.

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WESTVILLE, N. S., 30th Sept., 1895.

E. GILPIN, ESQ.,

*Inspector of Mines:*

DEAR SIR,—Having visited many of the gold mines within the Province, I herewith submit a condensed sketch of the position of affairs, &c., at each of such mines when I was there, as follows:—

*The Richardson Gold Mining Co.*—C. F. Andrews, Manager. Gardner McKenzie, Underground Manager. 37 men employed. The belt, which is now being worked, is 12 feet thick, and the slope is down 156 feet, on an angle of about  $40^{\circ}$ . The improvements in the machinery, to which I made reference in my last report, are giving good satisfaction. On a lead north of the Richardson belt and west of the Richardson mine, John McMillan has done a considerable amount of work.

*The North Star Mine.*—In this mine 6 or 7 men are employed prospecting the property, and have succeeded in striking a lead shewing indications of gold, and are tracing it along the surface. There are also 3 or 4 employed on what is called the North Star lead taking out some roof quartz. Rufus O. Rogers entertains sanguine expectations of the future operations in this mine.

*Country Harbor Gold Mines*—The St. John Mining Company, with O. B. Brown as Manager, and Murdoch Fraser as Underground Manager, have 35 men employed working on a belt 12 feet thick and lying at an angle of  $80^{\circ}$ , and are now down a depth of 250 feet, and to the west there is a belt 4 feet thick on which two shafts are sunk; one is down 30 feet and the other 60 feet.

West of the old Prince Mine John McQuarrie has 3 or 4 men employed opening up a belt with Donald McQuarrie in charge.

The belts run nearly north and south in this district.

*Antigonish Gold Mining Co.*—Operations in the old mine have

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ceased for the present, but all the men are employed working at the new mine which is 5 or 6 miles east of the old one and is known as the Modstock mine. J. C. McDonald is Manager and J. Mason, Underground Manager. Sixty-five men are employed. There are two shafts, one of which is down about seventy feet, and the other about sixty feet, and they are still sinking both shafts deeper. Both of these shafts are sunk on a lead six inches thick. There is also another shaft down about twenty-eight feet, and sunk on a belt of from 3 to 4 feet thick. This last named belt is a new discovery, the development of which will be watched with great interest. The access to this mine is very difficult, and we were compelled, owing to the impassable nature of the road, to leave our conveyance and walk on foot 5 miles to and from the mine.

*Cochran Hill Gold Mine.*—I found this mine idle at the time of my visit, as well as the Crow's Nest; but intending purchasers were carefully examining it, and have purchased it as I am since credibly informed. This property has been carefully prospected and bright hopes are entertained as to its further development.

*Eureka Mining Co., Wine Harbor.*—This mine has been idle all winter, but work has been resumed and the water in the mine is being pumped out. The lead is 3 inches thick. At this mine, when open, little work was done, and as it has been idle so long not much can be said about it until further developments are made.

*Barrasois Gold Mining Co.*—Mr. M. McGrath, Manager. Sixteen men are employed working on two leads, on the Romkey lead which is 10 inches thick with a shaft down 150 feet, and on the Twin lead, which is 8 inches thick, the shaft being 60 feet deep. A new boiler is being set up and other repairs are being made to the machinery, and effective work will very shortly be carried on here. Some work has lately been done on the old Plough lead, but it was idle when I was there. This is all the work going on in Wine Harbor at present.

#### GOLDENVILLE.

*New Glasgow Gold Mining Co.*—J. A. Fraser, Manager, with 30 men employed. Four leads are opened up, viz, Sears, 3" thick; the Strike lead, 3" thick; the Canada, 9" thick, and the North 5" thick. The mine is now being fitted up with the latest and most improved machinery. The Compressor has been set up and is giving good satisfaction. At the date of my visit the water was out, and they were hard at work setting up the mill, all the parts of which were on the ground, and they expected to be crushing in a month's time.

*Stellarton Gold Mining Co.*—John McQuarrie, Manager. George Herschfield underground Manager. Some work was done here on two leads, viz.: The Wentworth, 3 inches thick, and the other lead 9 inches thick. When I was there the mine was idle, and there

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being no one in charge that I could find, I did not obtain as much information in reference to the operations carried on as I would wish.

*The Springfield Gold Mining Co.*—A. J. McNaughton, Manager and Joseph Williams, Underground Manager. Twenty men are employed working on the following named leads and belts:—The Springfield belt, 4 feet thick, with 9 inches of milling ore; and the North belt, 3 feet thick, all of which is crushed. This mine has lately been fairly well timbered, and is working satisfactorily. The above comprises all that are working in this district

*Beaver Dam Gold Mines.*—George M. Christie and Wm. Tupper have this mine leased and have 15 men employed. The shaft is down 100 feet on the belt, and a tunnel driven from the bottom of shaft 100 feet across the belt, in driving which they have cut 50 feet of quartz. Fully 50 p c. of the tunnel is quartz, and the face of the tunnel at its present termination is quartz. The extent of the belt is therefore not determined, it is the finest appearance of quartz I have yet seen. There is another shaft down 25 feet on what is known as the twin leads, and there is a belt 8 feet thick, with 6 feet of crushing ore.

*Harrington Cove Gold Mines* were idle when I was there.

*The Dufferin Gold Mine* was also idle, but the management are keeping the mine in good condition and the water out, and are thus ready to start at very short notice.

#### CARIBBOO GOLD MINES.

*The Dickson Mine* is still being worked on the Angular vein 3 inches thick. The shaft is down nearly 300 feet. Forty men are employed. R. McLeod, late of the North Star Mine, is Manager, and Alexander Campbell, Underground Manager. There is a shaft down 270 feet on the Saddle lead on the Caffrey property. This lead is 8 inches thick, and 8 men are employed.

*The Lake Lead Mine.*—W. A. Saunders, Manager, R. L. Sherman, Undergronnd Manager. There are 36 men employed on a belt 15 feet thick. The shaft is down 160 feet perpendicular, and 540 feet on an angle of 36°. All of the overground plant has been remodelled. new engine house, new mill house, and mill with 10 stamps, new hoisting house, and new hoisting engine, 80 H. P. new boiler, 50 H. P. engine for running the mill, which is lighted by electricity. The Dynamo is run from the mill engine. There is also a new two storey house and smelting house. The old mill engine is now used for running the pumps. The hoist and mill are connected by a trestle-work 50 feet high. The upper part of the travelling way has new ladders with iron rungs. There is also a force pump kept

in order, with a quantity of rubber hose, in case of fire occurring around or in any of the buildings.

*The Bell Mine.*—W. J. McIntosh, Manager. There are 14 men employed, and the shaft is down 140 feet on a 12 inch lead, known as the McDonald lead. This mine has been pumped and at a very large expenditure been retimbered and is now apparently safe and satisfactory. It was a much needed improvement as hitherto the timbering was not satisfactory.

A new mill house and an engine with 15 stamps, together with a new house for manager, are likewise among the list of improvements.

*Moose River Gold Mines.*—D. Touquoy, Manager, Thomas Reynolds, underground Manager. Seventeen men employed. There are two belts, one called the North belt, 5 feet thick, the other called the little Copper belt, 3 feet thick. During last winter the mill was kept crushing steadily from surface gravel which gave from  $1\frac{1}{2}$  to 2 dwt. to the ton. The shafts are down 130 feet on both leads and the mine looks very well.

*Moose River Gold Mining Co.*—The shaft is down 135 feet on a belt 4 feet thick. Here Arthur Higgins has 13 men employed.

H. Wilson has 6 men working on the Montreal property. Robert Russel has six men working on the same property in a shaft which is down 70 feet on a 5 inch lead, known as the Copper lead; the appearance of the mine is fairly good.

*The Mooseland Gold Mines.*—H. G. Stemshom, Manager, G. A. Irving, underground Manager. Twenty-five men employed. The shaft is down 125 feet, and there is a tunnel driven north 24 feet cutting a 5 inch lead, also one driven south twenty (20) feet cutting a 2 inch lead. Then there is a new mill with 10 stamps, self-feeding running in good order. A new residence has been built for the manager.

*Tangier Mines.*—John Murphy has 5 men working on the Essex property, on a belt 8 feet thick, with about 6 feet of crushing ore. He has cut three other gold bearing leads, and is now looking for the nugget lead.

*Nova Scotia Gold Mining Co., Montague.*—W. R. Thomas, Manager. William Collins, Underground Manager. Thirteen men employed working on the Wolfe lead, down 110 feet driving west. This mine was full of water at the time I was there, and the manager absent, consequently I could get very little information regarding the mine.

*The Salisbury Mining Co.*—This mine has been idle for about a



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year, but preparations are now being made to resume work, and William Temple, Manager, has now 5 men working making the necessary arrangements.

#### WEST CHEZZETCOOK.

*The Anderson Mine.*—John H. Anderson, Manager. Wallace Dukeshire, Underground Manager. Seventeen men employed on the Luke lead, 8 inches thick; they are down 100 feet with the shaft. There are also some men trenching north, prospecting for another lead, supposed to be there, as pieces of a very rich gold bearing lead are found in the drift. Mr. Anderson has done considerable work further west than where he is now at work, yet the largest amount of work was done east of his present operations. As he worked westerly the leads were lost, but finally were again discovered, and he has now proven that the leads on which he is now working runs west over 1,000 feet. Further, he has also found the leads which he passed as he was going west. They had jumped north 150 feet; now he can go back and pick them up at any time he deems it requisite. The centre of this property is very low and wet, therefore the work has principally been done on the outside. Yet sufficient work has been done to prove the position of all the leads in it that crops to the surface. There is no doubt the property contains many leads that do not come to the surface.

*The Oxford Gold Mining Co.*—G. J. Partington, Manager. Twenty men are employed developing the property. The shaft is down 90 feet. The Coleman lead is 3 inches thick, then there are the Copper lead and Kennedy leads both ready for work. There is also a fissure vein, about one half a mile north of Anderson's work. The vein in which they are at work is about 16 inches thick, a crushing of  $4\frac{1}{2}$  tons last month gave  $4\frac{1}{2}$  oz. equal 1 oz. to ton. The property in this district looks very good.

*East Waverley.*—B. C. Wilson, Manager, and James Warren, underground Manager. Five men employed. There is a tunnel in 800 feet, and a cut runs south along the lead 500 feet, also one north 200 feet. This tunnel gives them about 300 feet in height to strip the lead, and the length is not yet ascertained as both the 500 feet and 200 feet tunnels are each at their present terminations in good looking quartz. The lead is 18 inches thick and lying at an easy angle to work. There are some thousands of tons of quartz stripped and the mine in good condition. The management intend putting in a return airway before employing any more men.

*The Tudor Gold Mining Co.*—J. E. Hardman, Manager, and John Kenty, Underground Manager. Forty-five men employed underground, and 15 overground. The shaft is down 500 feet on the Dominion lead, which is ten inches thick. The Tudor lead is cut at 225 feet depth, also the Graham lead, and Hardy lead are cut at

225 feet. This mine is in fairly good condition ; well ventilated and good traveling ways, with stages at every 40 feet.

*The Oldham District* was idle in July when I arrived there.

#### RENFREW DISTRICT.

*The Pictou Development & Mining Co.*—D. A. McDonald, Manager, and K. D. Macdonald, Underground Manager. Twenty-five men employed. The shaft is down 80 feet in the Preeper lead, which is 8 inches thick. A shaft is down 240 feet on the McLeod lead, 8 inches thick. The Clemens lead, 10 inches thick, is opened by 2 shafts, which were nearly full of water when I was there, but the management were making preparations to resume work and were busy pumping out the water. The travelling ways are badly constructed, but a new travelling way is being prepared and, when completed, must prove of great benefit to the men. In other respects the mine looks very well.

*Sutherland's River, Pictou Co.*—It having become current to some extent that gold was discovered in this locality I went there and found two places being worked with 2 or 3 men in each place. One of these places was operated by the Eureka and Ferrona Co., and the other by the Cascade Mining Co. The place was well situated for water power. It is only about 4 miles from a coal mine and there are 3 or 4 quartz leads. The lead shewn to me as the one from which the gold was obtained resembles the barrel quartz at Waverley, excepting that the Sutherland's River lead is over 2 feet thick and full of riffles or rolls and carries lots of iron and other metals. The whin and slate appear good, and taken on the whole the indications are favorable to the finding of gold at these places spoken of.

I have the honor to remain,

Yours very faithfully,

WM. MADDIN, JR.,

*Dep. Inspector of Mines.*



## REPORT OF INSPECTION TRIP OF MINES OF LUNENBURG AND QUEENS COUNTIES.

DR. E. GILPIN,

*Inspector of Mines :*

SIR,—I beg leave to lay before you the following report of a trip of inspection of the gold districts of Lunenburg and Queens Counties.

Business among gold mining men in these counties is of much less volume than that of a few years ago, but one gets the impression that the working miner knows more now about the veins and the manner of the occurrence of the metals in them, and has acquired valuable experience in working the vein rock. The small amount of underground work done in the past is in striking contrast with the large amounts paid for the transfers of mining rights during the highly speculative period that affected these districts, and expended in large plants and numerous buildings. Had more of the capital been expended in the underground work a different state of affairs would have ensued from that at present existing. Lately a considerable number of properties have been bought at large discounts, and the present owners find themselves well supplied with houses, machinery and roads. With these advantages the present owners show considerable confidence, and an increased volume of business may be expected during the coming season. The appearance of the ore being mined justifies this confidence in legitimate mining. A fair amount of prospecting for new places has been going on, but scarcely any new locations have been made. Among the mines the safety of employees is secured as far as ordinary care can foresee. Very few pits would be classed as at all dangerous, and the amount of timber put in is generally in excess of the need for safety.

A few points of interest may be noted as relates to the licensed mills. An examination of the registration in the Department of Mines show that at different times 31 licenses have been issued for the working of quartz mills in the districts under consideration. After the changes that have occurred there remain 17 stamp mills and one wheel and pan machine. The following table shows the location of the mills and the numbers of stamps,

District.	No. of Mills.	Total No. of Stamps.
Gold River .....	4 .....	47
Ovens (Indian Path) .....	1 .....	10
Leipsigate .....	1 .....	10
Vogler's Cove .....	1 .....	5
Pleasant River .....	1 .....	10
Whiteburn .....	3 .....	30
Brookfield .....	2 .....	30
Molega.....	4 .....	60

With the exception of the 5 stamp mill at Vogler's Cove and the Webster Eaton 25 stamp mill at Gold River they are steam power mills.

The country roads to these mines and mills are generally in very good order for driving on.

The disposition more apparent among miners to throw aside preconceived ideas of how the rock in the veins should be and the adjusting of their mining work to the actual characteristics of the rock, inspires confidence in the ability to make these mines pay.

#### LUNENBURG COUNTY.

*Gold River.*—There was considerable activity in this locality during the summer. The Lincoln Co., successors to the Neptune Co., organized their business and started to pump out and re-work the mine. The property has a large equipment and the plans show a large extent of underground workings. At this mine the compressed air plant was utilized to help take out the water. An air lift was improvised by attaching the air pipe and discharge to an oil cask which was made to do duty as a receiver. The Oakdale Co. with B. C. Butterfield as manager, had opened up three veins and raised a good pile of quartz for the mill. A 10 stamp mill was erected and finished during the autumn. Mr. T. N. Baker prospected a large extent of the areas in the northeastern part of the district and had opened up a vein with a rich chimney in it. This rich ore was put through the 2 stamp mill that Mr. Baker had put up as part of the development plant. Miner T. Foster and Amos Hiseler carried on considerable prospecting about the river and stripped some rich looking ore.

*Indian Path.*—Some prospecting was done, and some encouraging ore was obtained.

*Leipsigate.*—Some prospecting for a new vein was all that was reported from this locality.

*New Dublin.*—This is a place where a large number of veins show themselves throughout the rock. Several blocks of areas were taken up and a little work carried on. Some of the leads stripped are reported to show gold fairly well.

*Pleasant River.*—The properties in this district seem to change hands very often, but little mining is done. This is largely due to the manner of the occurrence of the veins and rich chimneys. Rich ground is found in the veins, but the place and the style of the leads is so unlike any other place in the province that miners are usually working at a disadvantage when prevented from exploring the veins to test them. An increase of local information by the efforts of prospectors is needed to strengthen the confidence of property holders.

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QUEENS COUNTY.

*Brookfield.*—This district enjoys the distinction of having in it the most profitable mine working in these western counties. What was formerly known as the McGuire mine was bought in by the Brookfield Associates Company. The workings were repaired and the western extension of the profitable paying ore was opened out. A new engine house with hoisting plant and inclines were built. An interesting feature of the workings is the incline built from the engine house at the western end of the mine through the old workings to the bottom of the main shaft, making it some 400 feet in length. This idea was adopted on account of the dip of the main body of the good ore, making deeper westwardly on the course of the vein. The incline and pump are kept advancing as the foot of the stopes is worked back, and the ore is worked down the stopes to the ore cars at the bottom of the incline. This mine has undoubtedly a considerable body of vein sight in these stopes, and similar paying bodies may be found in the adjoining veins. The mine in the eastern part of the district, and formerly worked by the Philadelphia Company, was pumped out and repaired. A careful examination shows considerable good ore in sight in this mine. In the western part of the district a new vein showing a large proportion of gold was discovered by Peter Dunbrack. Several veins were tried during the season, and the outlook for considerable returns from this district is fully justified.

*Molega.*—The condition of this district is difficult of estimation. The Molega Company have largely reduced the amount of their work. Some new ground on the veins is being tried. The Boston Company property has been under the management of Mr. Turnbull, and the work has been largely development of new ground. In September a large body of ore, 5 feet in width, was opened in the mine, and the gold showed fairly well. The Minneapolis mine workings were pumped out and extended under the management of Mr. Dixon, and the quantity of ore and showing of gold justify the expectation of a resumption of full operations here.

*Whiteburn.*—Occasional spurts were made in this district about the mines. Different men report themselves ready to undertake resumption of work when the property holders can put up the capital for the work. The property holders are largely residents of the United States and give as the reason for closing down at Whiteburn the necessity of protecting their interests in matters affected in the United States. Prospecting in this county is reported from the wide quartz vein at Westfield and over the rich drift at West Caledonia and Middlefield.

All of which I respectfully submit,

F. W. CHRISTIE.

## MARBLE, Etc.

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Considerable work has been done by The Bras D'Or Marble Co. at their quarry, West Bay, Cape Breton, and they are now about in a position to enter the market. I append an extract from information furnished me by Mr. D. McLachlan, their manager.

In our marble quarry, our work this season has been altogether in channeling through the cracked marble. We have channeled eight floors, each floor containing about 4,000 cubic feet of marble, or about 32,000 feet in all. Of this about ten per cent. would be good sound marble. We have in our quarry 1 steam channeler (Wadrell), 1 steam hoist capable of lifting twenty tons, 1 lowering gear, for lowering any sized block of marble, up to twenty tons, down the incline from quarry to mill, which is at the wharf. This incline is eleven hundred feet from quarry to mill, and has a fall of 284 feet. The loaded car going down brings the empty one up. We use on this gear the best steel wire rope (Lang's Lay), which we imported from England. In addition to the Wadrell steam channeler, we have one of the best steam gadders made by the Sullivan Machine Company, of Clairmont, New Hampshire. In our mill at wharf, we have two Merriman gangs, also one 12-foot rubbing bed, one machine for making tiles, and one tile squarer. This machinery will be driven by a sixty horse power engine and a seventy-five horse power boiler, which we are now setting in place, and will have it running in three weeks. In addition to this, we have a shipping wharf with eighteen feet of water. We have not shipped very much marble as yet, as we have not been able to saw it, until we get our new engine started. Our quarry is improving very much as we go down, and now we are getting very much sounder marble than we did before.

During the season there were 5000 tons of limestone quarried, and about 350 tons of marble shipped and 1800 barrels of lime burned. The closing of the St. Peter's Canal for repairs during great part of the shipping season materially interfered with the progress of the company.

## IRON MINING.

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During the early part of the year work was dull; in the summer, however, business improved, and at the close of the year was satisfactory.

The Ferrona plant, owned by the New Glasgow Iron, Steel and Railway Company, was amalgamated with the Nova Scotia Steel Company of Trenton, in the same county. Work here presents no new points of interest. The mines on the East River owned by the company have been worked as required to supplement the supplies of ore from Torbrook and Antigonish. It is expected by the company that the hematite furnished by the Torbrook mines will be more or less replaced by supplies of the same class of ore to be drawn from a property they own at Bell Island, near St. John's, Nfld.

The Londonderry works also show the general improvement in business, and it is reported contemplate re-opening their rolling mill.

The Pictou Charcoal Iron Company ran during the month of October, 1894, for an output of 323 tons, but kept their mine open during greater part of the year and sold their output to the Steel Company.

The Torbrook Iron Mining Company worked steadily during the season, its output being divided between the Ferrona and Londonderry furnaces. The vein was found on the Holland property, about three quarters of a mile to the westward of the mine, to be uniform, of good quality and four feet thick. The main shaft at the Torbrook mine is now 350 feet deep. The angle of inclination of the bed of ore which was about 80° at the surface is now 45°; and the vein has increased in thickness from 6 to 12 feet.

The returns show that the following amounts of pig were made:—

Pictou Charcoal Iron Co.....	323	Tons.
Nova Scotia Steel Co.....	17,321	"
Londonderry Iron Co.....	11,446	"
Total.....	29,090	"

There were 79,636 tons of ore mined of which amount in addition to 598 tons smelted, the Charcoal Company mined and sold 7,541 tons. There were 36,000 tons of coke reported from the Ferrona and Stellarton Coke ovens, and 25,050 tons of limestone were quarried. Further information will be found in the tables at the end of the report.

## COPPER MINING.

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During the past season the copper deposits at River John received a little attention. The Eastern Development Company did not do any underground work. Their returns show 423 days skilled labor and 1,178 days unskilled labor above ground. The Company has purchased some more surface, and performed some above ground labor at the mines. Dr. E. D. Peters, the well-known copper metallurgist, has been engaged in revising the Company's plans and designs for concentrating and smelting the ore. He claims that, with the cheapness of ore fuel and the natural advantages of Sydney Harbor, copper can be produced here more cheaply than elsewhere. It was understood during the summer that steps were being taken to reorganize the company, with a view to starting the railway, concentrating works, &c.

## MANGANESE ORE.

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During the past summer there has been little to report about this mineral. The trade has been dull, but at the close of the year the demand had increased.

The Tennycapc Manganese Mining Company, (D. C. Fraser, Esq., M. P., President) are the owners of large tracts of manganiferous lands at Pembroke, Walton, and Tennycapc. During the past season only the last-named mine has been working. The estimated output for the year ended September 30th was 110 tons.

All of which is respectfully submitted by,

Your obedient servant,

E. GILPIN, JR.,

*Inspector of Mines.*

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

IRON.

No. of LEASE.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	No. of Sq. Miles.
84 .....	Prothero, P. ....	Cape Breton	.....	.....	1
86, 93 .....	Moseley, E. T. ....		.....	.....	2
.....	McLean, Jno. ....		.....	.....	1
91 .....	Brookman, Phoebe .....		.....	.....	1
92 .....	Matheson, D. ....		.....	.....	1
102 .....	Smith, W. ....		.....	.....	1
103 .....	McKenzie, H. R. ....		.....	.....	1
104 .....	McKenzie, J. W. ....		.....	.....	1
43, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59 .....	Bartlett, J. H. ....	Pictou	.....	.....	15
60, 68, 70, 71 .....	Nova Scotia Steel Company .....	"	Grah'm Fraser	New Glasgow.	4
72, 73, 75, 77, 78, 79, 80 .....	Holmes, S. H. ....	"	.....	.....	7
61, 67 .....	Cameron, Jno. A. ....	"	.....	.....	1
1 .....	McIntosh, J. C. ....	Hants	.....	.....	1
2 .....	McDonald, L. ....	Antigonish	.....	.....	1
92 .....	McAloney, Jno. ....	Cumberland	.....	.....	1
5 .....	McDougald, Jno. ....	Antigonish	.....	.....	1
10 .....	Fraser, W. J. ....	Inverness	.....	.....	1
16 .....	Inverness C. I., R'y Co. ....	"	.....	.....	1



1, 2	Nova Scotia Steel Co.	Guysboro	Grah'm Fraser	New Glasgow.	2
74	Andrews, H. M.	Pictou			1
22, 82	McMillan, Jno. R.	Inverness			2
0	Nova Scotia Steel Co	Pictou	G. Fraser.	New Glasgow	1
	COPPER.				48
145	Drummond R (& Iron)	Cape Breton			1
142	Le Cras, Henry	"			1
126	Matheson, A.	"			1
116	Greener, John	"			1
106, 95	Eastern Dev. Co.	"			2
105, 181	Burchell, J. E.	"			1
94	McKenzie, D.	"			1
2	Grant, J. A.	Antigonish			1
3	Gray, B. G.	"			1
4	McInnis, Hugh	"			1
12	Jones, A. C.	Inverness			1
7	Nichols, T.	Victoria			1
6	Hardman, J. E.	"			1
21	Manley, A. J.	Inverness			1
5	Cove, J. W.	Colchester			1
	LEAD.				16
143	Cape Breton Silver Mining Co.	Cape Breton...			1
2, 3.	Fraser, C. F.	Colchester			2
					3

## LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

## COAL.

No. of Lease.	Name of Owner.	County.	Agent or Manager.	Address.	No. of Sq. Miles.
1 <sup>2</sup> 23, 42, 3, 4, 62, 63, 64 69	Acadia Coal Co. ....	Pictou	H. S. Poole ..	Stellarton ...	18
5/12, 6/13, 9/14	Intercolonial Coal Mining Co. ....	"	C. Fergie .....	Westville....	3
8/6	Nova Scotia Steel Co. ....	"	.....	.....	1
10/24	Richey, M. H. ....	"	.....	.....	1
11/11, 45, 10	Gray, B. G. ....	"	.....	.....	4
66/46	Fergie, C. ....	"	.....	.....	1
46	New Glasgow Iron, C. & R'y Co. ....	"	.....	.....	1
56, 22/51, 74, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104	Canada Coals & R'y Co. ....	Cumberland	A. Dick .....	Joggins ....	29
55, 16, 17, 18, 16, 20, 21, 61, 62, 70, 71, 6, 7, 8, 44, 62, 55, 72, 73, 75, 76, 77, 78, 79, 81, 82, 83, 84, 85, 87, 88, 90, 177, 0.0.0.0.0.0.0.0. 0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	Cumberland R'y & Coal Co. ....	"	J. R. Cowans..	Springhill ..	48
90	"	"	.....	.....	4
8/5	Lawson Mining Co. ....	"	.....	.....	1
6/12	Londonderry Iron Co. ....	"	.....	.....	4
15	Prospect Mining Co. ....	"	.....	.....	2

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9/22, 10 11 12 13 23, 28, 29, 30,	Styles Mining Co.....	"	.....	5
23/53	Milner, C .....	"	.....	1
24/7, 25/9	Boston Coal Mining Co .....	"	.....	2
57	Salt Springs Coal Co .....	"	.....	1
26/16	Minudie Mining Co.....	"	.....	1
58, 59, 60, 61	Tupper, C. H .....	"	.....	4
63, 93, 105	Leckie, R. G.....	"	.....	3
65	Annand, C.....	"	.....	1
66, 67, 68, 69	Cowans, J. R .....	"	.....	4
80	Gue, T. R .....	"	.....	1
86	Rutherford, John.....	"	.....	1
91	Fraser, H. R.....	"	.....	1
89	Hickman, J. S .....	"	.....	1
94, 107	Weatherbe, U. J .....	"	.....	2
94	Hayward, A. A .....	"	.....	1
				<u>103</u>
13/79. 1/27, 2, 3, 28, 29, 30	General Mining Assoc., ltd .....	Cape Breton.	R. H. Brown. Sydney Mines	23
58/67, 173	Weatherbe, R. L .....	"	.....	1
42/52, 49/53	McLeod, Hugh.....	"	.....	2
45/5, 46/28, 47/29	Burns, A .....	"	.....	3
50/40, 51/41, 52/42		"	.....	3
60/54, 61/55, 62/56, 63/57, 64/58, 65/59, 66/60, 67/61, 68/62, 69/63.	} Dominion Coal Co., ltd.....	"	.....	10
108, 109, 110		"	.....	3
			<i>Carried forward..</i>	<u>45</u>

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

COAL.—(Continued.)

No. of Lease.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	No. of Sq. Miles.
111, 179, 180, 164, 168, 190, 0	Roberts, F.	Cape Breton	.....	Br't forward.	45
112, 113, 114, 115, 117, 118, 0	Cowans, R.	"	.....	.....	7
127, 130	Fairbanks, E. C.	"	.....	.....	7
128, 129, 134, 135, 136, 139, 144	Moseley, E. T.	"	.....	.....	1
135	McKenzie, R.	"	.....	.....	7
138, 149, 184, 0	White, A. J.	"	.....	.....	1
140	McColl, J.	"	.....	.....	4
141, 177, 0	Cumberland R'y & Coal Co	"	.....	.....	1
146	Tremaine, B. E.	"	.....	.....	3
159, 160	Morrison, A.	"	.....	.....	1
166	Dunn, J.	"	.....	.....	2
161	Routledge, E.	"	.....	.....	1
169, 170, 183	McVey, James	"	.....	.....	1
178	Routledge, W.	"	.....	.....	3
165	Stephens, L. H.	"	.....	.....	1
163, 185	Hamilton, C. F.	"	.....	.....	1
193, 194, 0	Copeland, J. D.	"	.....	.....	2
162, 188	Dominion Coal Co	"	.....	.....	3
171, 174	Gorham, J. W.	"	D. Mackean	Glace Bay	77
		"	.....	.....	2

0	Burchell, J. E	"	1
0	McKinnon, D. L	"	1
0, 0, 0, 0	Kennelly, D. J	"	4
0	Austin, J. H	"	1
0	Harold, T. C	"	1
0	Routledge, T	"	1
0	Hickey, C	"	1
0	Morrison, M	"	1
0	McCuish, A	"	1
0	McKenzie, J. A	"	1
0	McKenzie, James	"	1
175	McDonald, J. W	"	1
182, 0	Cossitt, G. G.	"	1
167	Murray, John	"	1
			187
1/2	Burchell Bros	Victoria	3
1/13	McGregor, J. D.	Inverness	3
2/6	Ross, H. E	"	1
6/4, 7/10	Shannon, S. L	"	2
8, 9	Fraser, W. J	"	2
11	Meagher, N. H	"	1
19, 20	Smyth, J. J	"	2
12, 13, 14, 15	Broad Cove Coal Co	"	4
26	McKenzie, J. W	"	1
		Carried forward...	19

## LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

## COAL.—(Continued.)

No. OF LEASE.	NAME OF OWNER.	COUNTY.	AGENT OR MANAGER.	ADDRESS.	Sq. Miles. No. of
18	Drummond, R. ....	Inverness	.....	Br't. forward.	19
0	Macnab, William. ....	"	.....	.....	1
24	Hussey, W. P. ....	"	.....	.....	1
16	Jones, A. C. ....	"	.....	.....	1
17	McNeil, W. ....	"	.....	.....	1
23, 25	McColl, J. ....	"	.....	.....	2
27, 3/11	Boston & N. S. C. Co. ....	"	.....	.....	2
0	Tupper, M. ....	"	.....	.....	1
0, 0, 0	Wallace, W. V. ....	"	.....	.....	3
0	Tremaine, E. D. ....	"	.....	.....	1
0	Ross, W. ....	"	.....	.....	1
1, 7, 8	Terminal City Co. ....	Richmond	.....	.....	3
2	Columbia Coal Co. ....	"	.....	.....	1
3	Reynolds, W. K. ....	"	.....	.....	1
5	Chisholm, Wm. ....	"	.....	.....	1
4, 6, 0	Lennoxville T. & C. Co. ....	"	.....	.....	2
0	Catherine, Joseph. ....	"	.....	.....	1
0	McLellan, W. W. ....	Colchester	.....	.....	4
1	Ross, George. ....	"	.....	.....	4
					51

TABLE A.—COAL TRADE BY COUNTIES, FOR THE YEAR ENDING SEPTEMBER 30TH, 1895.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	143,213	122,458	119,174	106,939	323,514	299,360	4,824	4,040	590,725	532,797
2nd "	113,829	99,911	70,247	54,514	122,259	27,847	462	346	306,797	182,618
3rd "	121,384	97,729	95,318	84,684	280,858	253,501	2,391	1,696	499,951	437,610
4th "	116,943	102,112	131,597	122,647	439,320	450,633	3,912	2,940	691,772	678,332
Total	495,369	422,210	416,336	368,784	1,165,951	1,031,341	11,589	9,022	2,089,245	1,831,357
Year 1894	543,749	479,350	455,992	412,039	1,185,355	1,114,773	15,059	13,580	2,200,235	2,019,742

TABLE B.—COAL TRADE BY COUNTIES, FOR THE YEAR ENDED SEPTEMBER 30TH, 1895.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia :																
Land Sales.....	23,696	72,883	26,815	111,954	84,329	.....	10,222	11,248	97	328	.....	.....	146,200	168,460	26,412	341,072
Sea Borne .....	22,166	1,731	.....	35,956	2,755	.....	195,868	39,909	8,793	4,580	211	.....	238,570	44,606	8,798	291,969
Total Nova Scotia..	25,862	74,614	26,315	147,910	87,084	.....	206,090	51,157	8,890	4,908	211	.....	384,770	213,066	35,205	633,041
New Brunswick .....	92,465	43,520	45,678	9,539	1,449	.....	29,104	4,614	1,489	672	.....	.....	181,780	49,583	47,162	228,525
Newfoundland .....	.....	.....	.....	286	.....	.....	77,311	1,521	1,252	1,140	82	.....	78,687	1,553	1,252	81,492
P. E. Island.....	86	1,436	9,684	17,972	17,443	.....	8,049	7,533	323	756	.....	.....	26,813	26,412	10,007	63,232
Quebec .....	35,010	5,697	39,205	76,864	8,386	.....	506,097	54,754	12,782	1,303	.....	.....	619,274	68,837	51,987	740,098
West Indies.....	.....	7,697	.....	1,365	.....	.....	2,810	.....	.....	.....	.....	.....	4,175	7,697	.....	11,872
United States.....	.....	14,996	.....	536	.....	.....	50,634	4,325	2,606	.....	.....	.....	51,170	19,321	2,606	78,097
Other Countries .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	153,373	147,960	120,877	254,422	114,362	.....	880,095	123,904	27,342	8,779	243	.....	1,296,669	386,469	148,219	1,831,357



## COAL.—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1895.	Year 1894.
Nova Scotia :						
Land Sales...	106,677	79,785	66,872	87,738	341,072	383,239
Sea Borne ...	119,586	21,299	56,366	94,718	291,969	288,644
Total N. S. ....	226,263	101,084	123,238	182,456	633,041	671,883
New Brunswick...	71,321	43,903	54,292	59,009	228,525	221,844
Newfoundland....	40,247	3,980	13,878	23,387	81,492	97,378
P. E. Island.....	17,631	.....	11,243	34,358	63,232	63,734
Quebec.....	142,157	31,307	220,310	346,324	740,098	877,743
West Indies.....	4,149	527	313	6,883	11,872	5,526
United States ....	31,029	1,817	14,336	25,915	73,097	79,837
Other Countries...	.....	.....	.....	.....	.....	1,797
Total.....	532,797	182,618	437,610	678,332	1,831,357	2,109,742

## COAL.—GENERAL STATEMENT.

1895.	Produce.	Sold.	Colliery Consump- tion.
1st Quarter.....	590,725	532,797	59,988
2nd " .....	306,797	182,618	49,541
3rd " .....	499,951	437,610	47,005
4th " .....	691,772	678,332	46,880
Total.....	2,089,245	1,831,357	203,414
1894.....	2,200,235	2,019,742	198,552

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED SEPTEMBER 30TH, 1895.

COLLIERY.	Produce.	SALES.			Total.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
Chignecto .....	660	474	56	.....	530	56	64
Joggins .....	110,082	76,282	18,794	.....	95,076	11,044	2,864
River Hebert.....	2,599	1,359	.....	.....	1,359	1,045	95
Springhill .....	381,032	74,399	128,983	120,877	324,259	30,057	14,493
Scotia.....	996	859	127	.....	986	.....	.....
Acadia .....	206,798	113,309	60,653	.....	173,962	24,774	5,212
Intercolonial .....	209,538	141,113	53,709	.....	194,822	11,304	4,272
Dominion .....	905,671	690,648	91,228	27,342	809,218	51,525	16,536
Sydney .....	259,608	189,220	32,676	.....	221,896	17,116	10,646
North Sydney .....	672	227	.....	.....	227	.....	65
Cape Breton .....	10,344	8,451	243	.....	8,694	1,890	348
Broad Cove .....	1,245	328	.....	.....	328	.....	8
Total.....	2,089,245	1,296,669	386,469	148,219	1,831,357	148,811	54,603

Statement of number and classes of Men employed, etc., etc., at each Mine during the Year ended September 30, 1895.

COLLIERIES.	UNDER GROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average No. tons per cutter.	Average tons raised per day.	Horses.		Pits worked.
	Skilled Labor.	Labo'rs.	Boys.	Days' Labor.	Skilled Labor.	Labo'rs.	Boys.	Days' Labor.	Skilled Labor.	Labo'rs.	Boys.	Days' Labor.	Persons.	Days' Labor.					
Joggins .....	172	53	22	68976	7	52	3	21427	4	9	...	3771	822	94174	690	400	5	7	273
River Hebert .....	7	1	...	2182	2	1	...	1010	2	1	1	690	15	3932	373	...	...	2	194
Springhill .....	297	207	52	172395	80	116	25	58596	2	...	...	756	779	231747	1282	1360	...	21	277
Acadia .....	235	239	67	122365	67	122	38	67645	10	12	...	4592	790	194602	880	1070	18	21	193
Intercolonial .....	238	95	67	87660	33	89	10	42106	8	8	...	5042	548	134808	880	790	12	9	268
Dominion .....	1090	500	236	360251	344	331	52	181725	8	11	...	1962	2572	548938	831	4190	56	190	216
Sydney .....	342	50	92	127332	65	99	33	57817	...	...	...	...	681	185149	756	915	7	60	285
North Sydney .....	3	1	...	723	1	1	...	534	4	2	...	1859	12	3116	...	...	8	...	...
Cape Breton .....	20	20	...	8140	4	8	2	8347	1	...	...	132	55	11619	517	...	2	...	76
Broad Cove .....	4	2	...	1575	2	5	...	2126	5	1	...	1782	19	5483	...	...	8	1	...
Total .....	2408	1168	536	951599	605	824	163	436383	44	44	1	20486	5793	1408568	...	...	...	...	...

## COLLIERY CONSTRUCTION ACCOUNT, YEAR ENDING SEPTEMBER 30, 1895.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machin- ery.	Colliery Build'gs.	Dwell'gs.	Surface Works.	Railway.	Wharv's.	Prospt'g.	Miscel.	Total.
Joggins .....	\$1,333	3,194	11,496	7,769	4,330	.....	.....	.....	.....	10,823	.....	38,945
River Hebert .....	.....	1,496	10	400	20	.....	.....	50	.....	.....	.....	1,976
Springhill .....	.....	.....	.....	2,822	2,000	.....	.....	.....	.....	.....	.....	4,822
Acadia .....	367	.....	.....	23,565	6,023	.....	.....	.....	.....	.....	.....	29,955
Intercolonial .....	381	.....	.....	13,986	9,144	1,151	.....	.....	.....	.....	.....	25,179
Dominion .....	1,019	2,734	11,106	1,677	150	1,575	.....	.....	.....	.....	.....	18,261
Cape Breton .....	.....	.....	870	363	61	180	.....	.....	193	666	.....	2,333
North Sydney .....	25	.....	415	1,000	371	.....	.....	800	4,850	.....	.....	7,461
Broad Cove .....	.....	80	1,371	701	588	3,670	.....	7,206	1,029	4,510	.....	19,155
<b>Total!.....</b>	<b>\$3,125</b>	<b>7,504</b>	<b>25,268</b>	<b>52,283</b>	<b>22,687</b>	<b>6,576</b>	<b>.....</b>	<b>8,573</b>	<b>6,072</b>	<b>15,999</b>	<b>.....</b>	<b>148,087</b>

## COAL

## NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1873	264,760	75
1851	116,274	"	1874	138,336	"
1852	87,542	"	1875	89,746	"
1853	120,764	"	1876	71,634	"
1854	139,125	Free.	1877	118,216	"
1855	103,222	"	1878	88,495	"
1856	126,152	"	1879	51,641	"
1857	123,335	"	1880	123,423	"
1858	186,743	"	1881	113,728	"
1859	122,720	"	1882	99,302	"
1860	149,289	"	1883	102,755	"
1861	204,457	"	1884	64,515	"
1862	192,612	"	1885	34,483	"
1863	282,775	"	1886	66,003	"
1864	347,594	"	1887	73,892	"
1865	465,194	"	1888	30,198	"
1866	404,252	"	1889	29,986	"
1867	338,492	\$1.25	1890	50,854	"
1868	228,132	"	1891	25,431	"
1869	257,485	"	1892	13,883	"
1870	168,180	"	*1893	16,099	"
1871	165,431	"	†1894	79,837	40
1872	154,092	75	‡1895	73,097	"

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

\* Nine months only.

† NOTE.—After August 1st, 1894, duty on Round Coal 40 cents, on Culm or Slack, 15 cents.

‡ Fiscal year begins October 1st, and ends September 30th. (Cap. 4, Acts 1893.)

Nova Scotia Coal Sales, 1785 to 1895 (Inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw d 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	51,048	1847	201,650	1,533,798
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320		1851	153,499	
1796	5,249		1852	188,076	
1797	6,039		1853	217,416	2,399,319
1798	5,948		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775	1857	294,198		
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		
1804	5,976	1860	322,593		
1805	10,130	70,442	1861	326,429	4,927,339
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	7,317,430
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336	1871	596,418		
1816	8,619	1872	785,914		
1817	9,284	1873	811,106	13,910,136	
1818	7,920	1874	749,127		
1819	8,692	1875	706,795		
1820	9,980	1876	634,207		
1821	11,388	1877	697,665		
1822	7,512	1878	693,511		
1823	27,000	1879	688,628		
1824		1880	954,659		
1825		1881	1,035,014		
1826		1882	1,250,179		
1827	12,600	1883	1,297,523	1,819,945	
1828	12,149	1884	1,261,650		
1829	20,967	1885	1,254,510		
1830	21,935	1886	1,254,510		
1831	27,269	1887	1,373,666		
1832	37,170	1888	1,519,684		
1833	50,369	1889	1,576,692	1,752,934	
1834	64,743	1890	1,755,107		
1835	50,813	1891	1,786,111		
1836	56,434	1892	1,849,945		
1837	56,434	*1893	1,752,934		
1838	107,593	†1894	1,485,924		
1839	118,942	1895	1,485,924	2,019,742	
1840	106,730		2,019,742		
	145,962		1,831,357	1,831,357	
	101,198				
		839,954			
				Total .....	40,236,074

SUMMARY.

1785 to 1790	14,349	1841 to 1850	1,533,798
1791 to 1800	51,048	1851 to 1860	2,399,319
1801 to 1810	70,452	1861 to 1870	4,927,339
1811 to 1820	91,527	1871 to 1880	7,317,430
1821 to 1830	140,820	1881 to 1890	13,910,136
1831 to 1840	839,954		

\*Nine months only. † Fiscal year begins Oct. 1, and ends Sep. 30. (Cap. 4, Acts 1893).

GOLD.—GENERAL STATEMENT FOR YEAR ENDED SEPTEMBER 30, 1895.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per ton.		Total Yield of Gold.	
					Oz.	Dwts. Grs.	Oz.	Dwts. Grs.
Oldham .....	2	3484	1	594	.....	16 11	489	7 10
Brookfield .....	1	13212	1	3344	.....	11 21	1992	3 4
Sherbrooke .....	4	17271	3	3397	.....	11 10	1942	2 0
Fifteen Mile Stream .....	2	10703	1	4734	.....	11 5	2661	12 0
Gold River .....	2	2801	1	80	1	10 4	120	15 0
Lake Catcha .....	2	6241	2	1501	.....	11 10	858	15 7
Stormont.....	5	17628	4	16582	.....	5 2	4225	6 11
Caribou, Moose River .....	4	30711	4	11565	.....	5 12	3189	11 1
Renfrew .....	2	8303	1	1242	1	2 0	1366	17 0
Uniacke .....	4	13897	3	3516	.....	14 10	2535	13 13
Waverley .....	2	15083	1	6315	.....	4 21	1540	2 0
Unproclaimed and other Districts .....	7	20230	5	5212	.....	4 13	1190	12 23
Total.....	37	159564	27	58082	.....	.....	22112	17 21

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	GOLD RIVER.					UNPROCLAIMED AND OTHER DISTRICTS.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			
					Oz.	Dwts.					Grs.	Oz.	Dwts.	Grs.
October .....	...	204	8	...	...	...	5	2116	84	747	192	18	17	
November .....	...	73	2	...	...	...	5	2240	89	178	74	1	17	
December .....	...	12	...	...	...	...	5	1274	50	524	78	10	21	
January .....	...	...	...	...	...	...	5	954	38	559	121	1	2	
February .....	...	...	...	...	...	...	5	980	39	224	66	11	12	
March .....	...	...	...	...	...	...	5	1125	45	120	72	14	6	
April .....	...	541	21	...	...	...	6	2069	82	125	72	13	23	
May .....	...	645	25	...	...	...	6	2661	96	669	91	3	19	
June .....	1	840	33	25	38	5	6	2790	111	766	108	4	..	
July .....	1	249	9	12	15	5	6	1520	60	591	124	17	14	
August .....	1	237	9	18	22	8	5	1475	59	502	97	5	22	
September .....	2	...	...	25	44	17	5	1026	41	207	90	9	14	
Total .....	...	2801	...	80	120	15	...	20230	...	5212	1190	12	23	



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued).

MONTH.	LAKE CATCHA.					STORMONT.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts..					Gras.	Oz.	Dwts.
October .....	2	931	37	129	99	10	4	1060	42	2070	599	2	..
November .....	2	793	31	239	118	7	4	811	32	1198	345	1	..
December .....	2	818	32	173	65	1	4	1366	54	2049	430	9	..
January .....	2	388	15	187	76	..	4	1166	46	1550	314	1	..
February .....	2	352	14	201	71	14	4	1281	51	1283	303	3	12
March .....	2	392	15	71	57	15	5	1253	50	1459	282	5	12
April .....	2	445	17	82	62	2	5	950	38	1270	244	11	12
May .....	2	468	18	85	47	2	5	991	39	1257	242	4	..
June .....	2	423	16	96	54	7	5	566	22	696	258	9	..
July .....	2	415	16	97	69	13	5	2711	108	1161	331	14	9
August .....	2	440	17	79	96	15	5	2774	110	1299	408	8	10
September .....	2	376	15	62	40	9	5	2699	107	1290	465	17	4
Total .....	..	6241	..	1501	858	15	..	17628	..	16582	4225	6	11



MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued).

MONTH.	SHERBROOKE.						FIFTEEN MILE STREAM.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					%. Dwts.	Gr.					Oz. Dwts.	Gr.
October .....	3	332	13	27	20	...	2	557	22	388	182	...
November .....	3	519	20	11	87	11	2	917	36	390	247	...
December .....	3	1703	68	640	372	12	2	975	39	434	264	18
January .....	4	1388	55	333	128	16	2	885	35	246	144	18
February .....	4	1387	55	235	234	8	2	847	33	370	167	10
March .....	4	1163	46	342	214	...	2	811	32	395	165	2
April .....	4	114	4	328	185	...	2	738	29	92	38	...
May .....	4	146	5	290	116	12	2	769	30	369	206	13
June .....	4	6068	142	507	131	21	2	1010	40	400	222	9
July .....	4	1327	53	130	132	...	2	1047	41	470	252	...
August .....	4	1581	63	209	110	2	2	1085	43	600	409	2
September .....	4	1543	61	345	209	...	2	1062	42	580	362	...
Total .....	...	17271	...	3397	1942	2	...	10703	...	4734	2661	12

## MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued).

MONTH	UNIACKE.						WAVERLEY.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
October .....	3	1214	48	209	187	16	2	270	10	647	189	15
November .....	3	1282	51	226	142	3	..	270	10	608	190	..
December .....	3	1129	45	233	172	4	..	270	10	602	171	..
January .....	3	524	20	136	35	8	..	1687	67	627	180	..
February .....	4	422	16	93	288	10	..	1455	58	478	101	10
March .....	4	562	22	214	174	12	9	1614	64	523	167	5
April .....	4	1219	48	217	205	5	21	1704	63	615	140	7
May .....	4	1287	51	561	205	4	13	1703	68	476	123	..
June .....	4	1727	69	237	237	16	6	1582	63	455	102	..
July .....	4	1647	65	482	250	13	15	1583	63	371	45	15
August .....	4	1501	60	485	346	17	9	1443	57	495	73	10
September .....	4	1383	55	423	289	2	10	1502	60	418	56	..
Total .....	..	13897	..	3516	2535	13	13	15083	..	6315	1540	2

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued).

MONTH	OLDHAM.						BROOKFIELD.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.					Oz.	Dwts. Grs.
October .....	1	152	6	143	113	11 1	1	677	27	125	59	8 9
November .....	1	2215	88	66	109	16 12	1	783	31	100	86	2 9
December .....	1	434	17	58	68	5 .....	2	832	33	150	127	12 .....
January .....	2	202	8	66	40	0 16	2	1023	40	375	144	4 .....
February .....	2	165	6	43	22	3 12	2	1012	40	380	128	1 3
March .....	2	93	3	25	23	4 .....	2	1186	37	390	151	6 .....
April .....	1	86	3	45	53	11 .....	1	1307	52	300	140	16 7
May .....	1	74	2	85	18	6 .....	1	1583	63	393	221	0 13
June .....	1	63	2	46	22	9 9	1	1189	47	293	235	18 4
July .....	1	.....	.....	12	10	18 10	1	1396	57	272	211	..... 2
August .....	1	.....	.....	5	7	1 22	1	1146	45	202	183	4 .....
September .....	.....	.....	.....	.....	.....	.....	1	1078	43	364	303	10 5
Total .....	.....	3484	.....	594	489	7 10	.....	13212	.....	3344	1992	3 4



## INTERCOLONIAL RAILWAY.

*Statement shewing the number of Tons of Coal received at the following Stations, from the Mines in Nova Scotia, during the year ended the 30th September, 1895.*

Destination.	Tons.	Destination.	Tons.
Halifax .....	40,550 $\frac{3}{4}$	South River .....	18
Bedford .....	492	Heatherton .....	72 $\frac{1}{2}$
Windsor Junction ..	11,927	Bayfield .....	44 $\frac{1}{2}$
Wellington .....	45	Tracadie .....	134
Enfield .....	228	Har au Bouche ....	45
Elmsdale .....	277 $\frac{1}{2}$	Mulgrave .....	1,394
Milford .....	42 $\frac{1}{2}$	Point Tupper .....	66
Shubenacadie .....	290 $\frac{1}{2}$	Grand Narrows ....	91
Stewiacke .....	545 $\frac{1}{2}$	Belmont .....	54
Brookfield .....	118 $\frac{1}{2}$	Debert .....	6
Truro .....	11,184 $\frac{1}{2}$	East Mines .....	44
Valley .....	19	Londonderry .....	27,677
Riverside .....	6	Folleigh Lake .....	6
West River .....	34	Wentworth .....	6
Glengarry .....	6	Greenville .....	18
Hopewell .....	957	Thomson .....	6
Ferrona Junction ...	43,429	Oxford .....	648
Stellarton .....	3,547 $\frac{1}{2}$	Pugwash .....	1,020
Westville .....	25 $\frac{1}{4}$	Wallace .....	133
New Glasgow .....	6,891	Tatamagouche ....	273 $\frac{1}{4}$
Trenton .....	36,288 $\frac{1}{2}$	Denmark .....	100 $\frac{1}{2}$
Pictou Landing ....	44,838	River John .....	589 $\frac{1}{2}$
West Merigonish ...	11	Scotsburn .....	542
Merigonish .....	171	Pictou .....	10,396 $\frac{3}{4}$
Avondale .....	37 $\frac{1}{2}$	Salt Springs .....	6
Antigonish .....	2,135 $\frac{3}{4}$	Gloucester Junction.	487
Athol .....	12	Bathurst .....	6
Maccan .....	6	Jacquet River .....	6
Nappan .....	78	New Mills .....	19
Amherst .....	10,840	Dalhousie Junction .	6
Aulac .....	217	Campbellton .....	74
Sackville .....	3,743	Metapedia .....	1,500
Dorchester .....	1,294 $\frac{1}{2}$	Amqui .....	6
Memramcook .....	374 $\frac{1}{2}$	Cedar Hall .....	6
Painsec Junction ..	6	St. Octave .....	12
Shediac .....	308	Ste Flavie .....	18
Point du Chene ....	38	Rimouski .....	6

INTERCOLONIAL RAILWAY—*Continued.*

Destination.	Tons.	Destination.	Tons.
Moncton .....	18,348½	Cap. St. Ignace.....	6
Salisbury .....	1,127½	St. Charles Junction.	28
Petitcodiac .....	527	St. Henri Junct ....	10,872½
Penobsquis .....	566½	Chaudiere .....	43,443
Sussex .....	204½	Lewis .....	791
Apohaqui .....	18½	Point Lewis .....	270
Norton .....	74½	G.T.R. via Chaudiere.	7,586
Bloomfield .....	6	4, 2, 3, via St. John.	8,140
Hampton.....	480		
Rothsay .....	84½	Total .....	392,357¾
Cold Brook.....	2,943½		
St. John .....	16,577		
Harcourt.....	6		
Kent Junction ....	609	RECAPITULATION.	
Rogersville .....	6	Forwarded from	
Chatham Junction..	10,300½	Stellarton .....	159,861½
Millerton .....	6	Westville.....	11,338
Derby Junction ....	6	New Glasgow.....	28,613¼
New Castle.....	25½	Sydney .....	1,107
Trois Pistoles .....	6	Springhill .....	142,437
St. Eloie .....	18	Maccan .....	49,001
Isle Verte .....	12		
St. Arsene .....	18	Total Tons....	392,357¾
Cacauna .....	6		
Riv. du Loup .....	2,792		



ST. LAWRENCE COAL DELIVERIES—1895.

We are indebted to Messrs. Carbray, Routh & Company, Montreal, for the following comparative statement of the deliveries of Nova Scotia and foreign Coal to St. Lawrence ports during the season of navigation just closed. The figures show a marked decrease over the previous year of the returns of lower ports coal, while the foreign deliveries were increased by 14,771 tons. This may be accounted for to some extent by the general dullness of trade last winter, but another explanation is to be found in the fact that in 1894 about 30,000 tons were taken from the Montreal market to fill American orders consequent upon the great strike in the U. S. During the year about 30,000 tons of slack coal were imported from Great Britain in excess of usual receipts. American bituminous and anthracite (which is admitted free) were sold at lower rates, and the former found a market even at Montreal in competition with Provincial coals. Coke, which is also admitted free, was sold at ovens in Pennsylvania under \$1.00 per ton.

NAME OF COMPANY.	Montreal.		Sorel.		Three Rivers.		Quebec.		Totals.	
	1894	1895	1894	1895	1894	1895	1894	1895	1894	1895
General Mining Association.....	Tons. 74359	Tons. 73273	Tons. 8485	Tons. 8686	Tons. 3952	Tons. 1843	Tons. 22555	Tons. 31633	Tons. 109351	Tons. 115435
Dominion Coal Company.....	512269	415081	3151	8223	5529	7957	23173	23252	544122	454513
Intercolonial Coal Company.....	69151	66571	.....	.....	.....	.....	.....	.....	69151	66571
Nova Scotia Totals.....	655779	554925	11636	16909	9481	9800	45728	54885	823624	636519
Scotch, English, Welsh and American Bituminous. (By sea only.) .....	55849	79777	1932	.....	.....	.....	15877	8652	73658	88429
Total deliveries.....	711628	634702	13568	16909	9481	9800	61605	63537	796282	724948

!(Can. Min. Review.)

## MISCELLANEOUS RETURNS.

### LIMESTONE.

	Tons.	Value.
Arichat .....	130	\$104
" .....	*770	962
Bridgeville .....	14,594	....
" .....	102	....
Londonderry .....	10,444	....
Marble Mountain, West Bay .....	5,000	....
" .....	†18,000	....
" .....	‡350	....

### STONE.

	Tons.	Value.
Arichat .....	467	\$234
Amherst .....	1,967	9,813
" .....	....	‡7,132
Antigonish .....	8	10
		<hr/> 17,189

### SAND.

	Tons.	Value.
Windsor .....	225	\$675

### PLASTER.

	Tons.	Value.
Arichat .....	1,510	\$1,510
Baddeck .....	15,610	14,052
Windsor .....	96,035	96,035
Cheverie .....	14,045	7,407
Walton .....	6,100	5,763
	<hr/> 133,300	<hr/> \$124,767

\*Lime Barrels.  
†Marble.  
‡Grindstones.

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 PICTOU CHARCOAL IRON CO.
 

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	Tons.
Tons of iron ore mined and used in Company's furnace...	598
Tons of iron ore mined and shipped .....	7,541
	<hr/> 8,139

Average number of men employed (1 fireman, 2 timbermen, 2 boys, 20 miners).....	25
Average working days per month for eight months' operations .....	25

Furnace in operation only during October, 1894:—

	Tons.
Pig iron produced .....	323.6
Iron ore, washed .....	598
Limestone .....	102
	Bushels.
Charcoal about .....	40,000

ERNST A. SJOSTEDT,  
*Manager.*

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 RETURNS NOVA SCOTIA STEEL CO.'S MINES.—Pictou Co.
 

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Name of Mine.	Persons employed above Ground.				Persons employed below Ground.				Iron Ore - Raised.  Tons.
	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	
McDonald Mine.....	3	6	1	1422	8	13	....	1834	2006
Cameron Mine, 1st qr.	7	7	1	1885	18	39	....	6109	9973
"    3rd qr.	4	6	0	1396	10	18	....	3555	4282
"    4th qr.	4	8	1	723	16	22	....	2116	2489
Saddler Mine, 2nd qr.	5	12	0	1936	18	27	....	3985	4082
Grant Mine, 1st qr...	3	8	3	98	5	4	....	82	186
								Limestone.	
Holmes Quarry, 4th qr..	2	..	..	50	.....	.....	.....	.....	293
Black Rock " 1st qr	3	28	..	2088	.....	.....	.....	.....	6312
"    " 2nd qr.	3	23	..	481	.....	.....	.....	.....	1215
"    " 3rd qr.	3	20	..	382	.....	.....	.....	.....	898
"    " 4th qr.	3	18	..	1484	.....	.....	.....	.....	5966

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REPORT OF WORK AT TORBROOK MINES FOR YEAR ENDING SEPTEMBER 30, 1895.

MONTH.	Men employed above Ground.				Men employed below Ground.				No. of Shafts working.	Amount of Ore put out.
	Skilled.		Unskil'd.		Skilled.		Days.			
	Skilled.	Days.	Unskil'd.	Days.	Skilled.	Days.	Skilled.	Days.		
October .....	7	177	6	117	18	356	21	378	1	2182
November .....	7	178	12	156	16	362	23	485	1	2449
December .....	8	207	14	245	18	354	35	613	1	2163
January .....	10	261	14	332	20	411	36	832	2	2725
February .....	9	218	15	224	22	397	30	367	2	1830
March .....	10	266	9	225	20	491	26	497	2	2635
April .....	10	269	12	256	19	490	31	539	2	2519
May .....	8	217	12	247	23	490	29	548	1	2690
June .....	8	216	13	240	24	453	28	549	1	2133
July .....	8	218	14	275	19	451	30	580	1	2576
August .....	8	223	10	350	19	492	37	728	1	3017
September .....	8	186	11	260	21	553	35	748	1	3021
										29940

J. S. LECKIE,  
Manager Torbrook Iron Co., L'td,  
Torbrook, N. S.

## RETURNS FROM LONDONDERRY IRON MINES FOR YEAR ENDED SEPT. 30TH, 1895.

### WEST MINES.

OVERGROUND.					UNDERGROUND.			
1894.	Skilled Men.	Days.	Unskilled Men.	Days.	Skilled Men.	Days.	Unskilled Men.	Days.
October . . . . .	2	27	1	8	4	108	3	29
November . . . . .	2	39	2	17	3	53	10	352
December . . . . .	1	26	1	25	6	136	19	267
1895.								
January . . . . .	1	27	4	69	14	180	39	356
February . . . . .	1	24	4	70	14	220	44	856
March . . . . .	1	26	2	31	15	230	41	738
April . . . . .	1	26	3	54	12	265	31	625
May . . . . .	4	54	4	84	20	410	40	900
June . . . . .	3	75	6	132	22	510	41	950
July . . . . .	5	115	8	186	24	600	45	1050
August . . . . .	4	107	4	90	26	572	49	1080
September . . . . .	4	88	5	105	32	673	39	819

Ore mined, 17,365 tons.

### EAST MINES.

OVERGROUND.					UNDERGROUND.			
1894.	Skilled Men.	Days.	Unskilled Men.	Days.	Skilled Men.	Days.	Unskilled Men.	Days.
October . . . . .	1	26	..	....	2	31	1	21
November . . . . .	2	44	..	....	5	93	6	120
December . . . . .	3	74	2	44	10	220	10	192
1895.								
January . . . . .	3	68	2	34	10	180	6	108
February . . . . .	1	8	..	....	2	29	2	30
March . . . . .	1	4	..	....	3	26	3	26
April . . . . .	2	26	2	19	9	85	9	98
May . . . . .	1	10	2	15	3	15	2	12
June . . . . .	..	..	1	15	2	31	2	30
July . . . . .	3	69	4	80	3	45	4	60
August . . . . .	3	79	6	108	5	90	5	81
September . . . . .	3	72	4	94	6	168	9	189

Ore mined, 1,167 tons.

LIME QUARRY.

OVERGROUND.

1894.	Skilled Men.	Days.	Unskilled Men.	Days.
October .....	2	31	8	91
November .....	2	55	9	90
December .....	2	35	10	220
1895.				
January ....	2	36	11	240
February .....	3	52	9	210
March .....	2	36	11	240
April .....	3	52	9	210
May .....	2	42	9	180
June .....	2	45	9	190
July .....	2	26	11	130
August .....	2	44	9	210
September .....	2	38	8	160

Limestone quarried, 10,444 tons.

THE LONDONDERRY IRON CO'Y., LTD.,

By GEO. ROMANS.

### HALIFAX.

*Statement of Articles the Produce of the Mine Exported from this Port for Twelve Months ending 30th Sept., 1895.*

ARTICLES.	TONS.	VALUE.
Asbestos .....	137	10,700
Gold in Nuggets.....	.....	25
Gold in Bars .....	.....	222,194
Coal .....	39,972	118,898
Manganese.....	26	1,438
Other Articles.....	.....	445
		<u>\$353,700</u>

*Exports of Mines and Quarry Shipped from Hants County for Year ending 30th Sept., 1895.*

ARTICLES.	QUANTITY IN TONS.	VALUE.
Gypsum from Windsor .....	96,035	96,035
Manganese from Windsor ...	70½	4,750
Sand from Windsor .....	225	675
Gypsum from Cheverie.....	14,045	7,407
Gypsum from Walton .....	6,100	5,762
		<u>\$114,629</u>

Total Exports Gypsum, 116,180 Tons. Value, \$109,204.

H. W. DIMOCK, *Collector.*





2016











